

# THE IRON AGE

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## The Engineering Department Modernized\*

How Progress of Engineering Work May Always Be Ascertained—Compulsory School for Draftsmen—Practice in Assigning Work

—BY H. W. DUNBAR AND W. E. FREELAND

ONCE the work has been made up to standard and turned over to the manufacturing organization, changes are only possible through a change request properly signed and approved by the superintendent. Such change requests include added dimensions, changed limits, changed shapes, etc., which are asked for to facilitate manufacturing operations and methods. To regulate this change procedure a change slip has been designed, Fig. 13, the original half of which is filled out by the person desiring the change. In so doing, the

the change request. The party making the request thus gets a complete copy of the request and the reply by the engineering department, while the original section with the reply on the back is filed away. When change slips come to the department they are numbered and assigned to the proper division, and the work done and the reply sheet is returned to the sender.

A similar form and method is followed out on sub-standard parts, as shown by Fig. 14. In the shop parlance of this plant, a sub-standard part is

DRAFTING DEPARTMENT		1133
CHANGE REQUEST		DATE 8/21/15
WILL YOU PLEASE CONSIDER THE FOLLOWING CHANGE 4731		
Make note on drawing to call for drill 1/4" dia. when assembling.		
REASON FOR CHANGE: Easier to manufacture.		
SIGNED: G. E. O. K. J. S. G.		
Mr. G. E. O. K. J. S. G.		
REPLY		DATE 9-3-16
WE ( ) MAKE CHANGE IN 4731 as requested but drill must be also called for on detail drawing.		
REMARKS: To keep drawings complete		
SIGNED: G. E. O. K. J. S. G.		

Fig. 13—A change in a drawing desired by the manufacturing department is requested on a special form. In making the request the form is folded on the perforated line and a carbon copy of the request is made on the back of the bottom or reply section. The same procedure is followed in making the reply

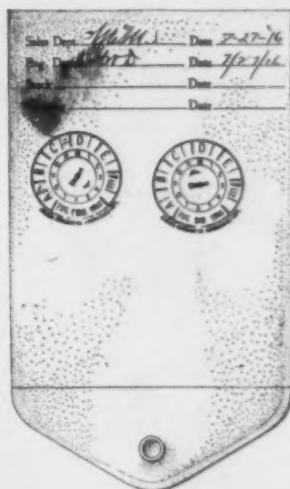


Fig. 12—The order envelope is the basis of authority for work in the engineering department and carries the engineering information to the shop. A time stamp shows time of receipt of envelope and of completion of the work in the department, this stamp having letters and spaces for assignment to the division which is to do the work

ENGINEERING DEPARTMENT		133 11
SUB-STANDARD PARTS		DATE 7-12-18
CONSIDER USE OF FOLLOWING PARTS WHICH ARE OUTSIDE OUR ENGINEERING REQUIREMENTS.		
PART NO. 7731 - Slower Boring - PIER 27		
FAULT: In turning they have been made .025" too short		
REASON FOR RECOMMENDING USE: They do not fit on length dimension		
SIGNED: Willis		
SUPERINTENDENT		
REPLY		DATE 7-12-18
THE ABOVE PARTS ARE TO BE DEPOSED OF AS FOLLOWS: The above parts may be used as they will in no way interfere with repair or replacement		
SIGNED: G. E. O. K. J. S. G.		

Fig. 14—To determine the final action on all parts which may be made that do not meet the requirements of the engineering department, a sub-standard part form is in use. This is employed in the same manner as the change request form. Thus each department has a copy of request and reply

slip is folded on the perforated line, a carbon sheet is placed between the two folded parts of the sheet and a carbon copy of the original request is made on the back of the reply half of the slip. When reply is made the same procedure is followed, which makes a copy of the reply on the original half of

\*Second and concluding part, the first, describing how designers have separate offices apart from general drafting room, how the blueprinting is done and the drawing records are kept, and how single machines are first built under the study of the engineering department, appearing in THE IRON AGE of Dec. 21. The practices are those of the Norton Grinding Company, Worcester, Mass.

one which has been made in the shop and which has not met the requirements of the engineering department as laid down by the drawings. This form is used to determine whether such parts as castings with too little finish on them, parts above or below given limits, in fact, anything which does not come within the engineering department requirements, but which has been submitted for consideration, may be permitted to enter into the machine assembly.

In order that the work of the room may be car-

ried on easily, and according to the established system and every man put in a position where he knows just what to do and how to do it, a drafting room bulletin folder has been devised in which is found the rules and regulations of the drafting room. It also includes data for the use of the individual designer or draftsman such as standards for screws, nut washers, studs, oil covers, etc. This bulletin gives the draftsman the necessary information in a concise, positive manner, obviating any possibility of misunderstanding, and making it possible for the new man to secure this information without taking up the time of the division head in explanation. The folder now contains about 65 bul-

On the time stamp the outer circle is divided into spaces for each division. Each space has two symbols, a letter for the department designation and one of the four numbers, noted below, to indicate the action desired:

- 1 = Act immediately on this.
- 2 = Sent for your information. Forward to any other designated division or to the file.
- 3 = Collect all records, letters or other information pertaining to this subject and bring them to the assistant chief engineer.
- 4 = Come to department head's office or call him on telephone.

Following the assignment of the orders by the assistant chief engineer, he immediately proceeds

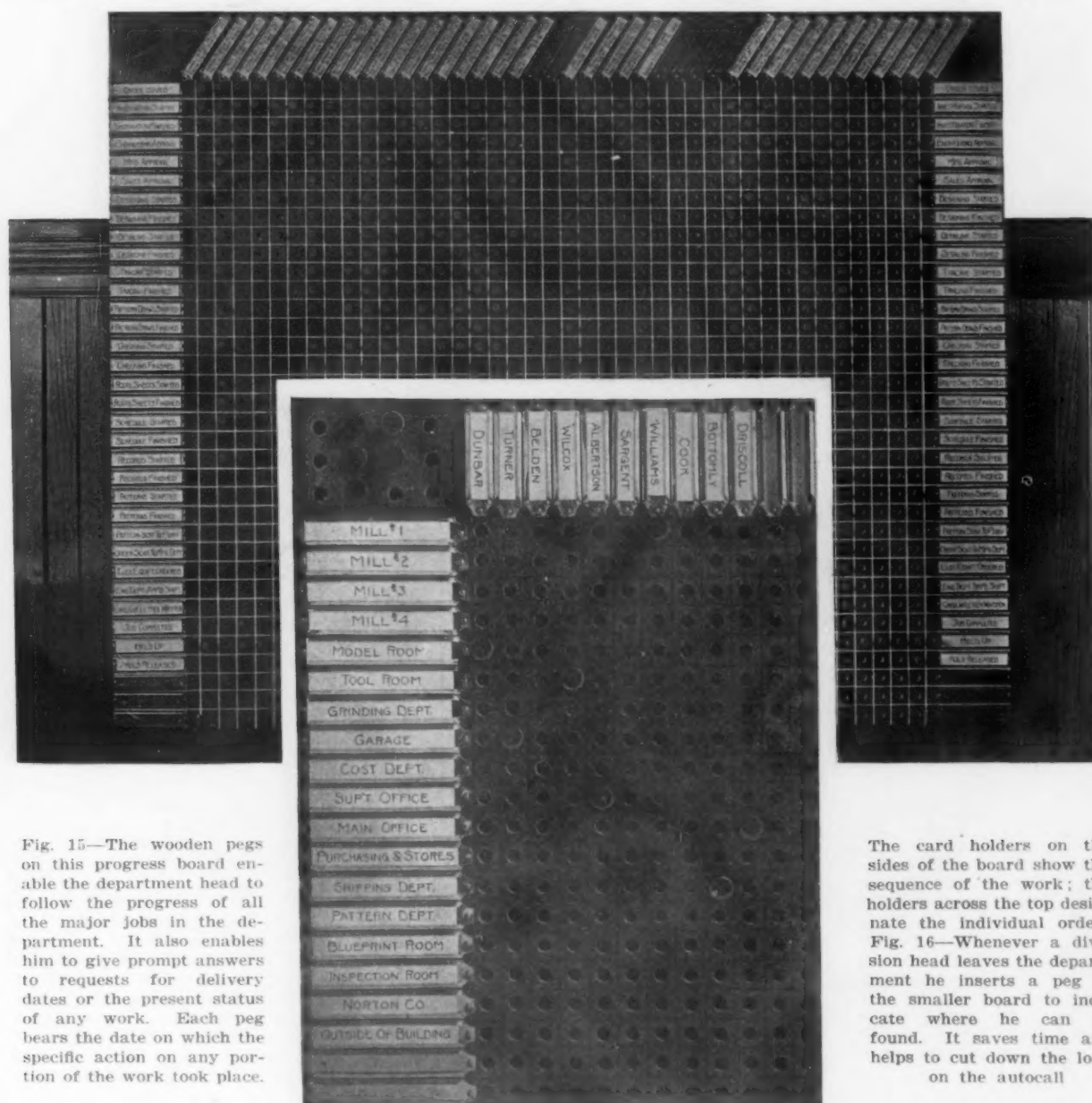


Fig. 15—The wooden pegs on this progress board enable the department head to follow the progress of all the major jobs in the department. It also enables him to give prompt answers to requests for delivery dates or the present status of any work. Each peg bears the date on which the specific action on any portion of the work took place.

The card holders on the sides of the board show the sequence of the work; the holders across the top designate the individual orders Fig. 16—Whenever a division head leaves the department he inserts a peg in the smaller board to indicate where he can be found. It saves time and helps to cut down the load on the autocall

letins, and new ones are issued as fast as new conditions arise.

#### FOLLOWING-UP WORK IN PROGRESS

A copy of all orders issued by the order department is sent to the engineering department for consideration. As soon as received they are stamped by the department clerk and the time when they enter the department is recorded. The form of stamp provides a place so that assignments can be made to the different divisions. All orders are passed to the office of the assistant chief engineer who assigns them to the proper division.

with the assistance of the clerk of the department to follow up the work by two methods. The first and most important method consists of a progress board, Fig. 15, which follows the work on all important jobs as the order passes through the various operations. This board handles only those questions of interest to the engineering department, which are as follows:

Order Issued, Investigation Started, Engineering Approval, Manufacturing Approval, Sales Approval, Designing Started, Designing Finished, Detailing Started, Detailing Finished, Tracing Started, Tracing Finished, Pattern Drawings Started, Pattern Drawings Finished, Checking Started, Checking Finished, Route Sheets Started, Route Sheets Finished, Schedule





day of the month that action takes place, and when these plugs are in position under the respective jobs being reported upon, one can tell at a glance the status of any particular job in which he is interested. This board has proved to be extremely convenient in answering questions over the telephone where it is not desirable to delay an answer and where detailed reply is required as to the various steps certain jobs have passed through and how much work has been completed. It is also convenient in making promises for the completion of jobs, the length of time required to finish various operations still unfinished, and in telling when the job will be ready to turn over to the manufacturing department where it actually passes through the machining operations.

With such a comprehensive and accurate chart of the general conditions of all major jobs at one's elbow, it is quite possible to make prompt promises of delivery date on rush work. It is the purpose of this board to record only such jobs as have sufficient work on them to warrant an appearance on the board.

After the job has been completed it remains on the chart for a stipulated length of time (generally a week is sufficient) when it is automatically re-

moved and gives place to the new jobs which are constantly coming in.

The same idea is worked out in a smaller board, Fig. 16, in which plugs are used to designate where division heads are when absent from the department. This has been found useful, as it helps to prevent overloading of the autocal system. It enables the shopman, who comes seeking one of the division heads—and few shopmen are inclined to use the telephone—to learn quickly where to find the man wanted.

As a means to keep in touch with the jobs of less importance, or jobs which may be considered as less active than those appearing on the progress board, a follow-up sheet, Fig. 17, is employed. This sheet (which forms a "tickler" for division heads for jobs of this minor class assigned them and on which they must make a report at predetermined and stipulated times indicated on the margin of the sheet) is filled with successive reports showing the progress of the work since the previous time that it had attention. This gives most conveniently an exact record of the work as it was being carried out and gives reasons for delays, interruptions, etc. The work of carrying on this follow-up system is assigned to the department clerk who arranges the

**DRAFTING ROOM REQUISITION**

SUBJECT No. 1 Countershaft

DESCRIPTION Redesign existing countershaft to include arrangements for increased pulley width and power, and to provide for the use of ball bearings.

**(20)**

REASON To meet new conditions in more work requiring greater power.

SUGGESTED BY Engineering Department Date 6/5/16

CHECKED BY Investigation preliminary to making working drawings

IF CHANGE ASCERTAIN No. of finished prints on hand Total value

Old price cost New price cost (estimated)

Estimated cost of drawings \$100. Pattern \$ 75.

A. printed Investigation Order No.

**PATTERN CHECK**

Pattern No. 4728 Now at Jones Fdy

Should be Returned to Northern Grinding Co

For Following Reason To check.

**(21)**

The Engineering Department has designated the time required to do this work and can have the Pattern ready to return to the Foundry within 3 days after arrival of same at above Company.

Please take up with undersigned the question of when this Pattern will be released by the Foundry.

Signed E. P. Wilson Date 7/19/16

**PULLEY BUSHING**

DATE	TO	FROM	REMARKS
1/6/14	MILLBURY	10	2004
5/8/1	ARCADE	10	
5/29/1	HARDY	10	
3/19	ALLEN	10	
5/27/1	WELLS	10	
4/8/1	COLVIN	10	
5/1/1	W'COMB, RUSSELL	10	
6/7/1	F'BURG, FDY. CO.	10	
7/14	HOME	10	

**(22)**

**CHANGE RECORD CARD** Req. No. 1006 Pt. No. 1048E

Pl. Name Spindle Bush. Changed 6-12-16

Reported by S. A. Wells Date 5-3-16

Why Changed So same pattern would make 1048E and 12971E

Description of Change Increase cord hole 1/16" and add chuck lug.

**(24)**

Changed by S. G. E. Ex. C. J. B.

**WEEKLY REPORT OF DRAFTING ROOM WORK**  
NORTON GRINDING COMPANY  
November 18, 1916

Item	GROUP	Last Week Report	Wks. Work last week	Wks. Added Work	Total Man Hours
<b>GROUP I</b>					
1. Miscellaneous Small Jobs		50	10	0	40
2. Motor Driven Machine				50	45
<b>GROUP II</b>					
1. Tools for Regular Machines		2525	155	0	2570
2. Standardize Drawing Room Information		250	5	0	246
3. Pattern Work		228	81	0	217
<b>GROUP III</b>					
1. Replacing Assembly Drawings		1000	250	0	750
2. Motor Pulley Information		10	1	5	14
<b>GROUP IV</b>					
1. Blueprinting for Engineering Dept.		58	15	20	63
2. Supervision of Vault		25	25	25	25
<b>GROUP V</b>					
1. Revise & rewrite schedules		214	59	0	156
<b>GROUP VI</b>					
1. 10-B Power Feed		600	45	0	555
2. Surface Grinding Machine R.O. 10,000		500	10	50	540
		5535	666	150	5019

TOTAL HOURS 5019  
AVAILABLE MAN HOURS PER WEEK 666  
REDUCTION OF MAN HOURS DURING WEEK 150  
REMARKS 20% IN SHORT FOR FULL FORCE

**(23)**

#### SOME OF THE FORMS USED IN DEPARTMENTAL ROUTINE

The drafting room requisition, Fig. 20, is prepared to advise the general manager of just what is affected by a new design or change. It must be approved by the general manager before an order can be issued. For all work to be done outside the department a simple requisition form made in duplicate is used.

To convey to the stock clerk of the manufacturing department information of renewals, repairs, changes or movements of patterns from one foundry to another, a pattern check form, Fig. 21, is filled out by the pattern supervisor. This conveys information as to how long a pattern will have to remain out of the foundry so that the stock clerk can adjust his orders and records.

The pattern supervisor fills out a pattern record form, Fig. 22, which shows the location of all patterns and their movement from one foundry to another.

When any change is made in a drawing which has become standard by having parts made a change record card, Fig. 24, is always filled out regardless of how small or how extensive the change. This card gives sufficient information to trace the change and is filed under the part number affected. On the back, as indicated, is a list of items which must be checked by the draftsman and examiner to insure that all items affected by the change are cared for.



**WEEKLY REPORT**  
ESTIMATED BY: [Signature]  
DATE: Dec 18 - 1916  
ITEMS: 1, 2, 3, 4  
REMARKS: [Handwritten notes]  
COLUMNS REPRESENT THE FOLLOWING:  
1 - LAST WEEK'S REPORT  
2 - HOURS WORKED LAST WEEK  
3 - HOURS OF WORK WORK  
4 - TOTAL MAN HOURS  
EACH ITEM MUST BE TOTALS AND EQUAL  
EACH COLUMN MUST BE TOTALS AND EQUAL

**SCHEDULE OF PARTS**  
NORTON GRINDING CO.  
FOR 10" CYLINDRICAL GRINDING MACHINES  
PART NO. NAME QTY. MAT. REMARKS  
[Table with columns for Part No., Name, Qty., Mat., Remarks, and Remarks]  
PARTS FOR ONE MECHANISM

**DRAFTING DEPT. REQUISITION**  
PLAIN GRINDING MACHINE  
NORTON GRINDING COMPANY, DRAFTING DEPT.  
[Handwritten notes and stamps]  
TO BE FILLED IN BY DRAFTING DEPT.  
[Handwritten notes and stamps]

**DRAFTING DEPT. ORDER**  
[Handwritten notes and stamps]  
[Handwritten notes and stamps]

## OTHER FORMS USED IN DEPARTMENTAL ROUTINE

For the convenience of division heads who are obliged to give a weekly report of the status of work in their divisions a blueprint form, Fig. 25, is used. From these a typewritten form, Fig. 23, is made up for the information of the general manager.

A schedule of parts of a machine or mechanism is made out on a special sheet, Fig. 26. This is used by the manufacturing department to draw materials from stores for machines, in the cost department for figuring costs, and in the stores department for governing stock records.

A special requisition form is filled out for erection prints, which are sent out with each size and type of machine to assist customers in setting them up. The upper half of the sheet, Fig. 27, is filled in by the person requesting the erec-

tion prints, and as a check the lower half is filled in by the engineering department with a list of the prints supplied.

Blueprints are ordered by the vault division on a special form, Fig. 28. This form is always required, and no prints beyond the quantity specified can be accepted, as the form is used as the basis of payment if done at piece work rates. When any part is changed or becomes obsolete a special form is made out advising the shop of such changes so that existing drawings can be returned for correction or destroyed.

The regular form of time clock cards is used, a brown card for direct labor, a yellow card for overtime and a pink card for departmental expense. These time cards are filled in with ink by each man. No time clock is used; in fact, the whole department is run on the honor system.

sheets in the order of their dates, so that the sheets for attention on a given date are always on top and can be taken off, reported on and turned over to the department head, who, after receiving the report, places another date for the follow-up on the margin and returns the sheet to the clerk.

## ASSIGNMENT OF WORK

An interesting feature of the routine of the drafting room is an arrangement which compels the division head to give some consideration to each and every job which passes through his division. In giving out a job to one of his draftsmen, he is required to use an assignment-of-work slip, Fig. 18, the use of which obviates any possibility of a misunderstanding between the division head and the man who is to do the work. It also makes it imperative for the division head to be sure of his ground—to know exactly what work is to be done and how he wishes it accomplished. It must be planned at some time and there is little question that handing the work over to the individual in a systematic way by some such method is an advance on the older hit-or-miss method which left a draftsman to flounder around until he found himself. It really aids the department head in planning his work. He can pile up jobs ahead of a man who is particularly adapted to some special class of work and it gives the man on the job a fair chance to make a good showing by furnishing him with a reasonably definite idea of what is wanted or what it is desired to accomplish. These slips when once turned over to the draftsman become his personal

property and no record or file is kept of them. It is felt that the draftsman in the interest of protecting his own work, will keep these slips for ready reference at any time, and this has proved to be a fact.

## STANDARD DRAWING FORMS AND CONVENTIONS

As the work at the Norton Grinding Company is highly specialized, it is quite essential that the standard drawing form shall convey complete information to the manufacturing department or operator. To this end considerable study has been given to the standardization of notes placed upon drawings, their relative position for different purposes, the size of sheet used for a given size of drawing, the title, form, etc. Fig. 19, a reproduction of one of the drawings, shows clearly the effort made to convey to the workman everything the draftsman knows about that particular piece and how it should be made and used.

The application of limits on drawings has been successfully accomplished by determining the proper commercial limits and insisting that every other dimension which can stand a limit larger than the commercial, or which of necessity must be closer than the commercial limit, shall always be specified in connection with the dimensions to which they are applied. The illustration shows clearly how this system is carried out. The note, which is printed on the tracing in a convenient place, gives to the operator directions as to how these limits are applied. It is too often the case that these limits are left to the operator's discretion, when it is ob-

viously true that the drawing room is generally in possession of this information and should be able to furnish it on the drawings.

Records and pattern prints are obtained in a simple way by making a blueprint from the machine drawing on cloth which can be used in making up the pattern and in turn preserved as a record of how the pattern is made. On this blueprint, which carries from the original nothing but the machining figures, is placed the pattern figures with black india ink. The cloth print, after having been dried and ironed, presents a surface which will take this ink readily and retain it permanently.

In order to make each man feel that he has a part, as well as a division or the department head, in increasing the success of the drafting room, weekly conferences are held each Friday afternoon from 5 to 5:30, and the interest taken in these conferences is so keen that they frequently last until after 6 o'clock. At these conferences any one in the department discusses ways and means he may have in his mind to simplify the work and suggestions are brought forward for improvements in conducting the work or carrying out the system.

Each day the division heads get together the first thing in the morning and go over the important matters for the day and the interesting incidents of the previous day.

A complete catalog file of all materials and machinery used in the business is maintained, and there is a somewhat limited department library which includes reference books. The general company library, containing an extensive list of technical books, is also available for the use of all employees.

Many trade and technical publications pass through the hands of the department head and such articles as are of material interest or are closely allied to the work are either clipped or abstracted and filed for future use. All such papers are circulated through the department for the information of those members who would be benefited by reading them, and all are privileged to take the papers out and carry them home for reading in leisure hours.

#### TRAINING COURSE FOR DRAFTSMEN

Every man in the department, regardless of his position, is required to take a drafting-room training course, during the period of which he is paid on the same basis as though he were working in the department. It is an investment on the part of the company designed to broaden the knowledge and viewpoint of each man. The first two weeks are spent in the grinding wheel manufacturing plant, at which time he simply observes the process of making wheels so that he understands their adaptation to certain kinds of work. Then he has two weeks on the assembly floor, actually taking part in the assembling of machines. He then has two weeks in the routing department, so that he is made to realize how drawings must be made to facilitate machining, and learns the limitations of the various machine operations in the manufacturing department. Two weeks in the inspection department teaches him the importance of the limits which he establishes on his drawings. Then follows two weeks of actual grinding practice during which he becomes accustomed to the operation of grinding machines.

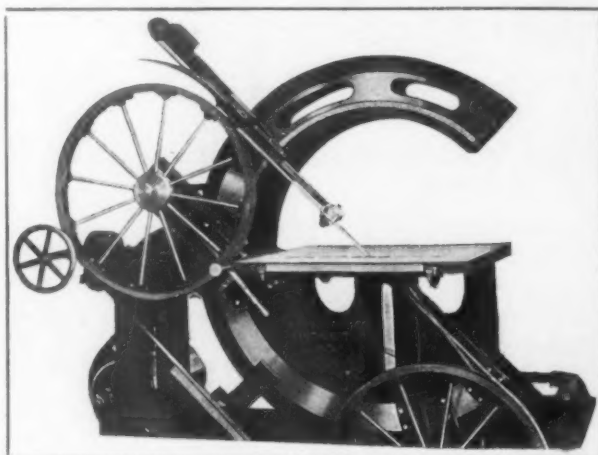
Then for one week he has to make sand molds of a number of patterns. The patterns are constructed so that some of them can be molded and some of them cannot, and he is simply thrown on his own resources to see what he can do. Then he

goes to the foundry for a week, where he observes molding and foundry practices. By this he is made to realize the importance of thinking how the part he is making on his drawing board can be actually reproduced in cast iron.

### A Tilting Wood Band Sawing Machine

A special type of band sawing machine for use in shops where heavy straight and curved cuts have to be taken in wood has been placed on the market by the J. A. Fay & Egan Company, Cincinnati, Ohio. The saw in this machine can be moved by power while in operation from the position shown to a corresponding angle, 45 deg., on the other side of the central vertical position. Among the plants for which this machine is designed are pattern shops turning out large work, railroad and bridge shops, plants handling heavy vehicle and implement work, lumber mills that get out large timbers sawed to special shapes, shipyards, etc.

The column is a massive one-piece casting with broad floor bases, this form of construction being relied upon to carry the wheels without vibration at any angle



The Saw in This Special Band Sawing Machine Can Be Tilted by Power from the Position Shown to a Corresponding Angle on the Opposite Side of the Central Vertical Position or to Any Intermediate One

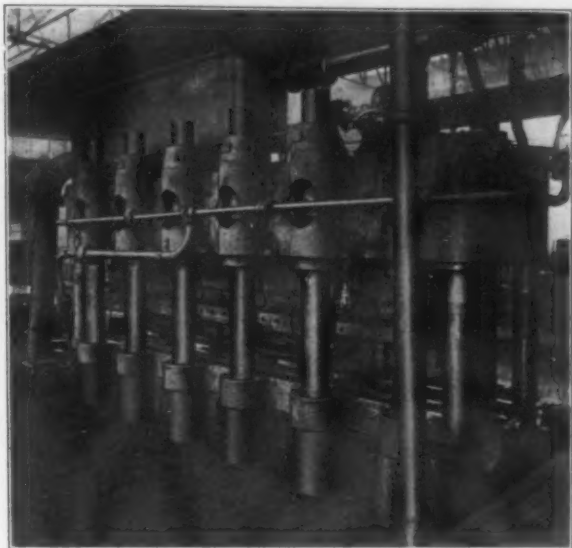
between the limits of 45 deg. on either side of the vertical. The face of the main column is planned and fitted with roller bearings to carry the saw carriage, guides, etc. An auxiliary column at the rear supports the mechanism for moving the blade to approximately the desired position, a handwheel adjustment being employed to give the final fine setting. The table, which is 48 in. square, is of iron, and is rigidly mounted on the main column. It is emphasized that the table, which is fitted with rollers to facilitate handling the stock, is always maintained in a level position irrespective of the angle at which the saw may be set.

The maximum width of blade handled is 3½ in. The wheel shafts are mounted in self-aligning ball bearings and the wheels are mounted on a heavy circular carriage, gibbed to the main frame and having means for taking up any wear. Provision for vertical adjustment, side lining and tracking of the blade is furnished. The carriage supporting the wheels travels on self-lubricating roller bearings mounted in the main column. This arrangement is relied upon to enable the blade to be shifted from the position shown to a corresponding one of 45 deg. on the other side of the vertical by power, a handwheel adjustment being employed for very fine setting. The exact angle at which the blade is tilted is shown by an index. It is pointed out that as the wheels move simultaneously and in the same plane at all times, the cutting point of the blade is at one point on the table irrespective of the angle. The power angling device is controlled by a handle at the operator's position and has a device upon which stops can be set to check the movement automatically at any predetermined point.



### Press for Forming Truck Side Rails

A six-cylinder hydraulic side rail press has been developed by the Southwark Foundry & Machine Company, Philadelphia, Pa. It is intended for forming and



Two Side Members of Automobile and Motor Truck Frames Can Be Formed Simultaneously by This Six-Cylinder Hydraulic Press

shaping the side members of automobile and motor truck frames. The capacity of the press is two rails 175 in. long of 5/32-in. stock at the same time.

The press is built of steel castings and forgings throughout. A filling tank is located on top of the press. Operating the valve lever raises the press table, admits water under pressure to the lifting cylinders, while the press cylinders are filled from the tank. When the dies touch the material to be formed water under high pressure which performs a portion of the work is admitted and by supplying water at intensified pressure to the six press cylinders, the work is completed. This arrangement, it is emphasized, enables two side rails to be produced at each stroke of the press with a minimum amount of water at high pressure. The rate of operation of the press is 100 strokes per hr.

### Electric Furnaces as Absorbers of Idle Electric Units

The installation of electric furnaces in towns in order to utilize the electric units lying idle at the power station in slack time is suggested by a writer in *L'Echo des Mines et de la Metallurgie*, as referred to by the *London Iron and Coal Trades Review*. About eight years ago he saw the first installation of this kind near Turin, Italy. It consisted of two small Stassano furnaces of 100 hp. each and of two of 1000 hp. each, taking their current direct from the town's supply. The writer finds the idea gaining in France, for just outside Limoges a Keller furnace has been installed capable of melting and refining 30 tons of steel and iron turnings and other cheap scrap per day and producing 25 tons of high-priced castings, etc., or turning out ordinary cast iron of high quality when the current is obtainable cheaply. The furnace takes up but little space in the tramway station and calls for little attention because of ample labor-saving devices. The current comes from a hydraulic power station to Limoges at 30,000 volts, and is transformed to 10,000 and then to 110 volts to suit the furnace. It is presumed that the first heat would begin about midnight, or soon after the peak load is passed at the power station.

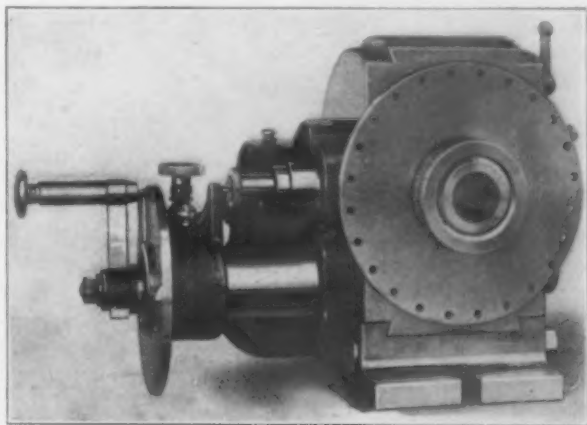
It is reported in Bristol, Tenn., that the Bristol blast furnace and the Crescent rolling mill, which have been closed for eight years, have been sold by the Virginia Iron, Coal & Coke Company, Roanoke, Va. The buyers are not named, but it is understood that the plants are to be operated.

### Indexing Head for Fine Graduations

The Brown & Sharpe Mfg. Company, Providence, R. I., has recently developed a new attachment for the spiral head and universal index centers. The special advantage claimed for this device, which is known as the micrometer index, is that irregular spacings in degrees and minutes can be readily secured, as well as results much finer than are ordinarily possible with regular equipment. In this way the careful consideration of index plates and calculations of differences which are likely to develop into errors are eliminated. With the largest plate regularly furnished for the builder's heads, which has a 49-hole circle, the smallest division obtainable by using one hole was 11.02 min., while with the micrometer index readings to 1/2 min. can be secured.

The attachment consists of a compact housing containing a worm on a vertical shaft which has a dial graduated to 1/2 min., located at the upper end. This worm meshes with a wormwheel, which is freely mounted on the spiral head wormshaft, the regular index plate being fastened directly to this wormwheel. The connection with the spiral head wormshaft is obtained by the regular index crank and pin engaging holes in the index plate. A single revolution of the index crank rotates the spindle through an arc of 9 deg., a 40 to 1 reduction mechanism being employed. This 9-deg. movement is reduced by a 36 to 1 reduction mechanism to 1/4 deg. for each revolution of the vertical shaft. As the graduated dial on the worm shaft has 30 divisions, the movement of one graduation turns the spindle of the spiral head through an arc of 1/2 min., thus giving directly an indexing to this reading.

The index is attached to the machine easily and does not interfere with the regular performance of the work of the spiral head. When the index is in use, the index-plate stop pin engages a hole in the attachment casting and prevents it from rotating, rotation being permitted through the worm and wormwheel in the attachment. When spirals are being cut or differential indexing is being done, and it is not desired to use the micrometer index, the stop pin is withdrawn and the operation is carried on in the customary way. To apply the attachment to the machine the regular wormshaft, eccentric sleeve and gear are removed and a new wormshaft and



The Combination of the Horizontal Index Crank and the Knurled Nut Back of the Index Plate Enables Readings as Fine as 1/2 Min. to Be Secured

sleeve furnished with the attachment substituted. The remainder of the mechanism is then slipped into place over the wormshaft eccentric sleeve, the regular plates, sectors and crank being used and held in place the same as before.

An interesting demonstration of the reliability of motor drive is afforded by an installation at the Cleveland Salt Works, Cleveland, Ohio. In the rooms where the motors have operated for the past 10 years moist salt has been always present and has become caked into the windings until it is almost impossible to see them. In spite of this fact the motors, which were built by the Lincoln Electric Company, Cleveland, are reported to have remained in service without a single shutdown due to motor trouble.

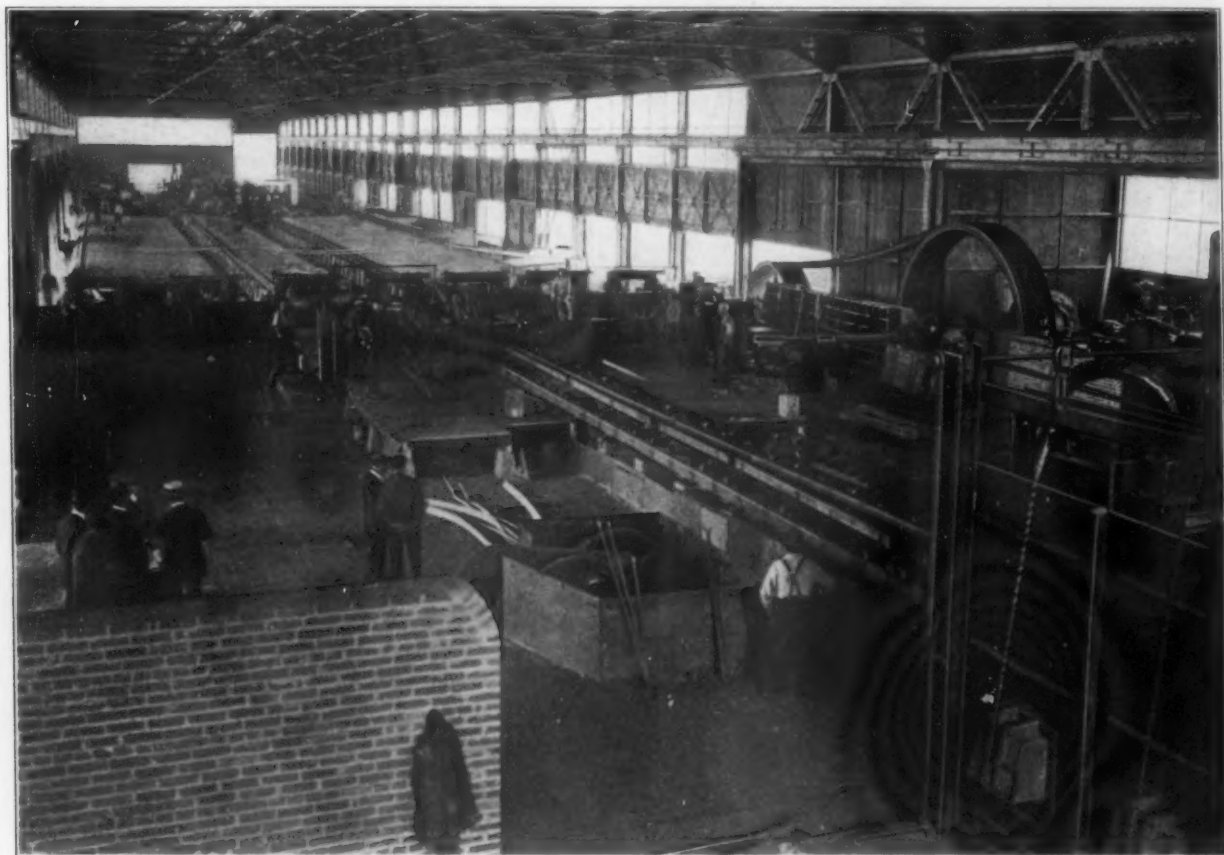


# Rail Rerolling Mill at Marion, Ohio

Works of Interstate Iron & Steel Company  
of 4000 Tons Monthly Capacity—Mill Structure 1100 Ft. Long—Waste Heat Utilization

**T**HERE has been an interval of about four years since the completion, in the Central West, of the last mill designed exclusively for the rerolling of old rails. It is, therefore, a reasonable expectation that the Interstate Iron & Steel Company, Chicago, has had the benefit of an unusual perspective in planning its new plant at Marion, Ohio, to replace its rail-carbon bar mill formerly

Of the total length of the craneway, 500 ft. of the south end spans and serves a yard for the storage and preparation of the rerolling rail stock. A 10-ton crane, with a span of 75 ft., traverses the entire length, and renders the handling of the stock entirely mechanical, as well as exceptionally rapid, both for distribution into piles of different sizes and for reclaiming when the rails are to be



General View of the Mill Looking from the Heating Furnace Toward the Roll Stands and Hot Beds

at Cambridge City, Ohio, and destroyed by fire in 1915. In locating the mill at Marion, with its four trunk-line railroads—the Pennsylvania, Big Four, Erie, and Hocking Valley—the expectation certainly appears to have been fully realized as regards transportation. The same line of rail-carbon steel products, including bars, small shapes, implement and bedstead steel, will be rolled, and the new mill has an output of approximately 4000 tons monthly.

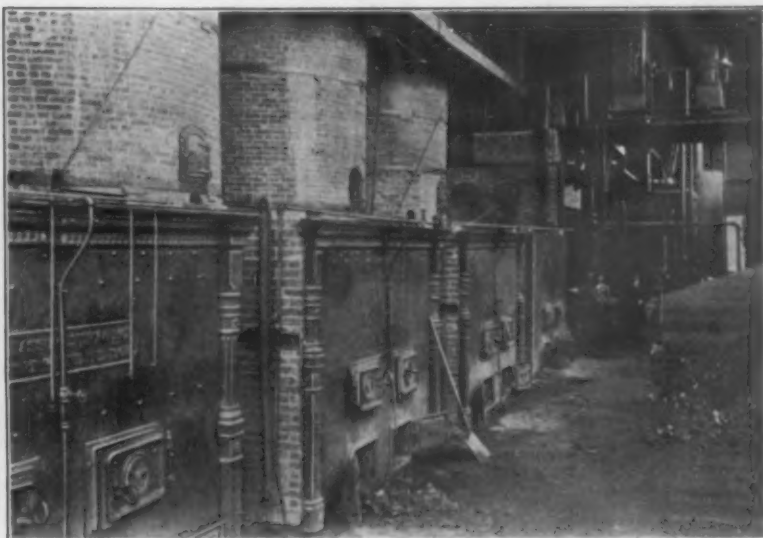
In the design of the works, two principal objectives have been sought: a straight-line process from raw material to finished product, and the reduction of manual operations to a minimum. Except for the housing of the power plant and mill shops and mill stores on opposite sides of the main building, the entire operation is confined within the one mill structure, 80 ft. wide and 1100 ft. long, having a continuous crane runway from end to end. The three general mill functions—storage, sorting, and preparation of the rail stock, the heating and rolling, and finally the cooling, shearing and shipping of the product—are thus linked together in fact as well as arrangement.

taken to the heating furnace. The rails coming into the plant by railroad are delivered on the spur which parallels the stock building, and are unloaded on inclined skids down which the rails slide to the rail breaker just inside the building and under the crane. This breaker is of an electrically-driven type, built by the Hogg Foundry Company from the company's design. The rails are broken to approximately 15-ft. lengths, the heating furnace and mill design dispensing with any provision for rolling from long rails, and may then be distributed in the stock yard according to size.

Preliminary to charging the stock into the furnace, it is weighed on a 20-ton Fairbank scale, whence the rails are skidded down to the charging end of the heating furnace. The furnace has an over-all width of 21 ft., and is 40 ft. long, and will receive from 75 to 90 pieces of rail at a time, or a charge of about 5 tons. A maximum length of rail that can be accommodated is 18 ft. The rails move along the furnace during the heating operation a distance of 30 ft. in an interval of approximately 30 min. Heating continuously, the



Rail Ejector for Pushing Heated Rail from the Furnace



The Vertical and Horizontal Steam Boilers, the Last with Induced Fan Taking Waste Gases from Heating Furnace

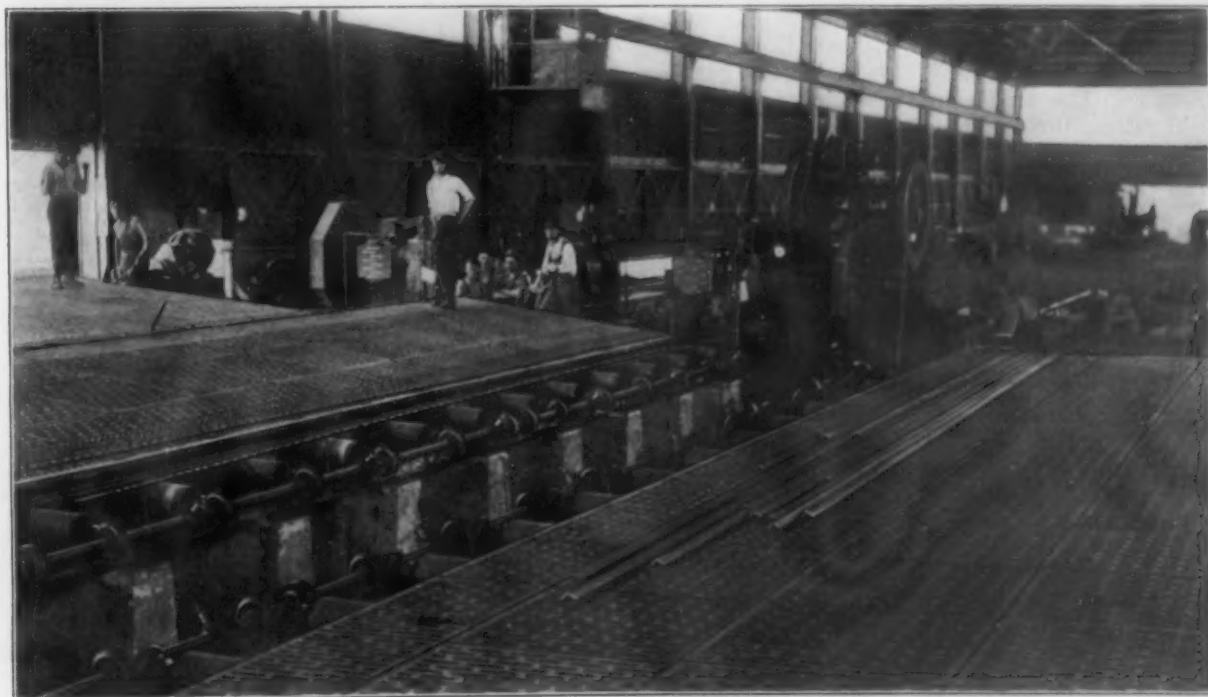
furnace can deliver 50 tons of hot rails per hour, the rails discharging at the rate of three or four per minute. The charging mechanism consists of a ram mounted at a right angle with the furnace axis, with a rack-and-pinion mechanism. The drive for the charging ram is also connected with the ejector so that a heated rail is automatically discharged from the furnace as a cold rail is put in. A view of the ejector is shown.

The furnace is coal-fired, the proximity of the mill to the Ohio coal fields making the use of direct coal firing expedient and economical. A furnace temperature of 2200 deg. Fahr. is regularly maintained. The furnace is of standard reverberating design for coal firing, with modifications developed in the company's practice. The rails are carried on pipe skids through which cooling water is circulated. To avoid heat loss, the water heated in the skids is circulated through the feed-water heater in the boiler house and then used at the mill rolls. A hydraulic pusher at the charging end of the furnace moves the rails along the furnace bottom during the heating operation. A view of the end

of the furnace, showing its relation to the mill, with the approach table to the slitting rolls in the foreground, is also here reproduced.

The mill consists of three two-high stands of 16-in. rolls and seven stands of 14-in. rolls, built by the West Penn Foundry & Machine Company. From the center line of the furnace to the center line of the 16-in. mill is about 80 ft., and from the 16-in. to the 14-in. mill the distance is 35 ft. The approach table delivers the rail to the center stand of the 16-in. mill, where it is slit three ways in the usual manner. The web passes directly to the 14-in. mill, and the base and head coming back on either side for two or more passes through the 16-in. stands, the mill operating after the manner of a Belgian mill. The rolling of the heavier base and head sections is thus equalized with the working of the lighter web section. In the general view of the mill and drives an alligator shear may be noted in the foreground, used for culling up cobbles and defective rails caught in the rolling.

The 16-in. mill is driven from an 800-hp. heavy-duty simple Allis-Chalmers Corliass engine, which



Cooling Beds at the Delivery End, Showing Also the Shear Equipment for Cutting to Length

also drives, by means of a rope drive, two stands of the 14-in. mill. The remaining five stands of the 14-in. mill are driven by a 700-hp. Hamilton Corliss engine located on the opposite side from the larger power plant. Power is also obtained from the large engine for driving a 200-kw. Bullock generator, from which current is supplied for crane operation, the shop drive, the large shears and other auxiliary apparatus.

The cooling beds are arranged in three parallel units, each 150 ft. long, with motor-driven runout tables and cast-iron perforated cooling plates carried on concrete piers. A general view of the cooling beds, which were built from designs developed by the Interstate Iron & Steel Company, is reproduced. At the end of the cooling beds are heavy vertical gap shears of Long & Alstatter manufacture for cutting the product to length, the capacity of the shears being adequate to the full range of the company's product.

The finishing department of the mill is also equipped with four Kane & Roach straightening machines and three twisting machines for the twisting of reinforcing bars, the latter of a design adopted in the previous experience of this company. The finishing department is also under the span of the crane runway, carrying a 10-ton crane, and materials can be loaded directly into cars spotted on a long stub spur which parallels one wall of the building for a length of 400 ft.

The boiler plant serving the mill engines consists of four 250-hp. vertical water-tube boilers built by the Bass Foundry & Machine Company, and one 417-hp. horizontal water-tube boiler built by the Oil City Boiler Works. The vertical boilers are handfired with coal, but the horizontal boiler is heated with the exhaust gases from the heating furnace, circulated through the boiler by means of a Bayley slow-speed induction fan. The boilers are inclosed in a boiler house 40 x 120 ft., in plan erected as a wing of the main building.

The machine-shop equipment includes, in addition to a standard assortment of machine tools, a Stewart tempering furnace, a Victor pipe-threading machine, and a steam hammer of medium size. The machine shop is spanned by a 5-ton Pawling & Harnischfeger crane and has a floor area 36 x 140 ft. For turning rolls, a single Frank Kneeland Company lathe and a double lathe manufactured by the Preble Machine Works are installed.

The Interstate Iron & Steel Company has been assisted in the design and erection of the mill by Walter Rachals & Co., consulting engineers, Youngstown, Ohio. The water supply is derived from artesian wells and stored in a water tank of 25,000 gal. capacity. For use in the boiler plant the water is treated in a Bartlett-Graver water-softening plant. For the reclaiming of water from the mill rolls a reservoir and settling basin have been built, with a capacity of 50,000 gal.

Tampton Aubuchon, manager of the Louisville Industrial Foundation, which has a fund of \$1,000,000 for industrial expansion of the city, has established headquarters in the Board of Trade Building, Third and Main Streets, Louisville, Ky. The board of directors of this body, it is proposed, will take rank as the Industrial Committee of the Board of Trade, so as to insure both organizations working together.

The American Association of Engineers will hold a national convention, Feb. 8, 9 and 10 in Chicago at the Hotel LaSalle. Work of a promotional nature will constitute the greater part of the program, which will be held under the slogan, "For the Good of the Engineer."

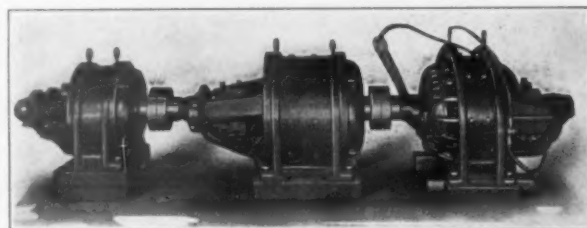
## Constant-Current Arc Welding System

An electric arc welding system operating on the constant-current, closed-circuit principle has been developed by the Arc Welding Machine Company, Inc., 220 West Forty-second Street, New York City. This system operates the arcs in series, and it is pointed out that this arrangement enables one size of wire to be used throughout the system, as the current is uniform and independent of the length of the circuit, as well as the number of operators.

A special type of generator, consisting of two units, is employed with the system. One of the units is the generator proper which furnishes the energy required to make the welds, while the other is the regulator which automatically maintains the current at a constant figure. These two units are driven by a motor, all three armatures being connected together mechanically. Separate excitation is provided for the regulator and by varying this with an ordinary field rheostat it is pointed out that the main welding current may be set at any value that is desired within the range of the machine and will be automatically maintained there.

The circuit leading from the generator is a single wire having sufficient cross-section to carry the current for one arc. From the generator it is run to the nearest arc, from there to the next and so on back to the generator. At the points where it is desired to do welding switches are inserted in the line and a special arc controller, which is either a portable unit or is permanently mounted at the welding station, is plugged in across the switch at which the work is to be done. The function of this controller is to maintain the continuity of the circuit, thus preventing one arc from interfering with any of the others when it is cut in or cut out of the circuit, while at the same time the heat which can be put into the metal of the weld is also controlled.

The current through the arc, together with the size of the pencil employed, determines the flow of metal from the welding pencil. The value of this current is adjusted by shunting any portion of the main current



Generator Set for a Constant-Current Closed-Circuit Arc Welding System Consisting of Generator to Furnish the Energy for Welding, a Regulator which Maintains the Current at a Constant Value and a Motor for Driving Them

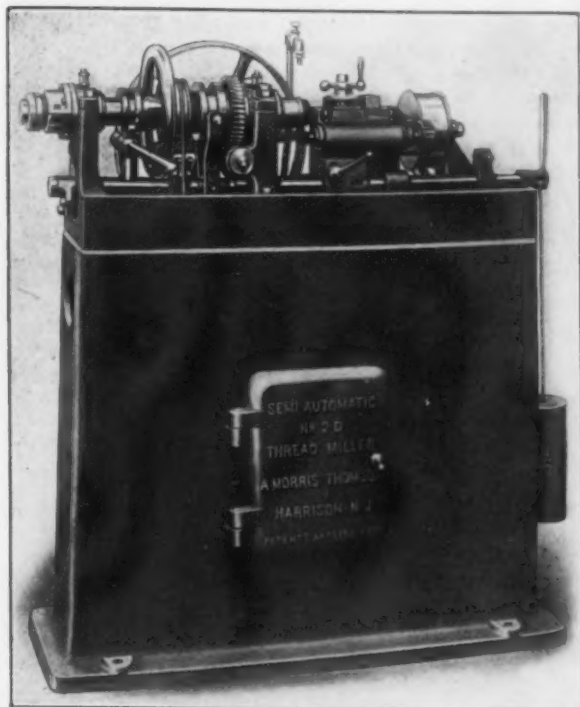
around the arc through a series-parallel resistance. With this controller, it is emphasized, the length of the arc is adjusted to suit the work and the operator, and if it is exceeded the arc is automatically short-circuited and remains so until the welder is ready to make another weld. Provision is also made for stopping the arc at will without lengthening it. One of the points upon which special emphasis is laid is that when the welding operation is stopped the arc is not broken, but is killed by a short-circuit which is placed across it, thus eliminating a crater with pin holes in the metal.

An exposition of first-aid treatment is the subject of the last issue of the *Spirit of Caution* published by the Conference Board on Safety and Sanitation, West Lynn, Mass. An exhortation to have wounds treated immediately by first-aiders, so called, as a preventive and to follow this treatment by a physician's examination, is told in story form. A combination all metal sanitary cot and stretcher, a compact first-aid kit and a wire-gauze splint are illustrated as convenient articles of the first-aid outfit. Concise instructions for the treatment of common injuries and disorders are tabulated.



## Semi-Automatic Thread Milling Machine

A series of semi-automatic thread milling machines is being built by the T. C. M. Mfg. Company, Harrison, N. J. They are designed for milling V-threads on rifle barrels, fuse bodies, primers and similar pieces primarily. With a multiple-cutter it is possible to mill



Milling V-Threads on Rifle Barrels, Fuse Bodies, Primers, and Similar Pieces Is the Work for Which This Special Semi-Automatic Thread Milling Machine Was Designed

threads on short pieces such as fuse bodies up to 2 in. in diameter, while if a rifle barrel or other long piece of work is being machined, the maximum diameter is reduced to 1 1/4 in. With this machine 129 bronze primers, 1/2 in. long and 1 3/16 in. in diameter, with 14 threads per in., have been produced in 1 hr. Fuse bodies 1/2 in. in diameter and 2 in. long made from an alloy of aluminum can be turned out at a slightly more rapid rate.

The work is held in a collet chuck operated by a hand lever the same as in a screw machine, this arrangement being relied upon to give quick action. The work spindle is rotated by a worm and wormwheel acting through a clutch which is automatically engaged by the advancing of the cutter into the work and disengaged when the spindle has made a complete revolution and the thread is finished. A weight is relied upon to assist the return of the work spindle to the starting position and thus serves to reduce the number of movements made by the operator to a small number, each of which is light and easily accomplished.

The cutter is set in a vertical head and the adjustment for depth of cut is secured by a screw having a large graduated collar reading to 0.001 in. A lever-operated cam is employed to advance the cutter into the work and automatic means for withdrawal are provided when the thread is complete. This arrangement, it is pointed out, enables work to be turned out rapidly as the operator does not have to give any thought to the size of the threads once a correct adjustment has been obtained, and the threads produced in this way are said to be both accurate and regular. The cutter head does not move when the cut is being made, the required lead being obtained by a steel threaded sleeve on the work spindle engaging with a split bronze nut. The machine is designed to produce large quantities of duplicate work rapidly but if a change of pitch is required this can be secured by removing the threaded steel sleeve and the split bronze nut and substituting others. The cutter and

the work spindles are both hardened and run in large bronze bearings having an adjustment to compensate for wear.

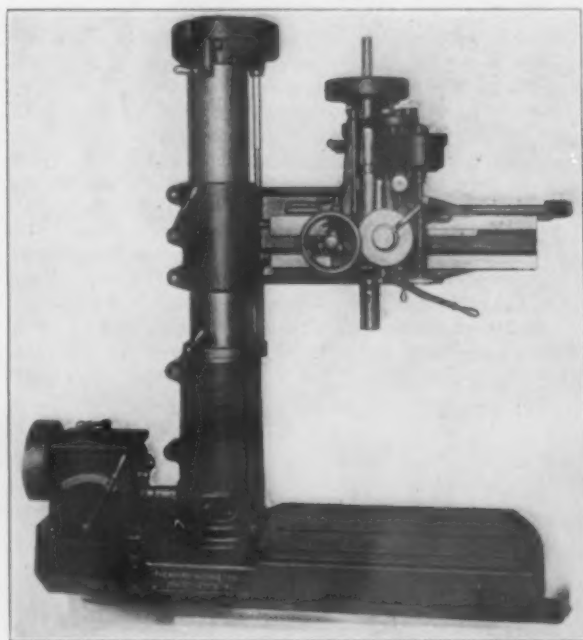
A reservoir for the cutting lubricant employed is formed by the base of the machine, a set of diagonal and vertical webs serving to separate the fine chips produced by the cutters from the lubricant. The machine occupies a floor space of 18 x 36 in. and weighs 1000 lb. The over-all height of the machine is 48 in.

## Radial Drilling Machine with 3 1/2-Ft. Arm

A new radial drilling machine is being constructed by the Morris Machine Tool Company, Cincinnati, Ohio. It is built in 2 1/2, 3 and 2 1/2 ft. arm reach sizes, and while no radical changes in its design are claimed, the manufacturer calls attention to the fact that steel gears are used throughout and that all bearings are made of bronze.

The machine is also constructed with a very large-diameter column that is well ribbed, and swivels on roller bearings in a heavily designed stump so as to insure perfect alignment under heavy strains. The arm bearing on the column is wide and is arranged to take up any wear. Only one lever is necessary to clamp it, and this is arranged within easy reach of the operator. The arm is raised or lowered by a screw actuated by tumbler gears on the cap. These gears are arranged so that they have a tendency to disengage, thus forcing the operator to keep his hand on the elevating handle while the arm is in motion. Should the operator forget to unclamp the arm, or should it reach either of the extreme positions, the gears would disengage themselves and he could not hold them in mesh.

The head is heavily ribbed and is moved along the arm in the usual manner by a rack and pinion through the left side as shown. The clutches are all heat treated and hardened. The reversing lever is at the right below the arm. The spindle is a hammered forging of high carbon steel. The spindle sleeve is



A Large-Diameter Column Reinforced by Ribbing and Turning on a Roller-Bearing Stump Is the Characteristic Feature of This Radial Drilling Machine, Which Is Built with 2 1/2, 3 and 3 1/2 Ft. Arms

graduated and a direct-reading depth gage and an automatic feed trip is provided. Ten spindle speeds are secured with the cone drive pulley and 12 with a speed box.

Motor drive can be arranged with an adjustable-speed motor with a four to one range or by a constant-speed unit in connection with the speed box.

## One-Man Detachable-Tongue Shop Truck

The Howe Chain Company, Muskegon, Mich., has been manufacturing and is now about to market more generally a one-man foundry and shop truck of novel



When this One-Man Foundry and Shop Truck Is Not in Use the Jack Tongue Is Readily Detached and the Truck Rests on the Pair of Wheels at the Rear and the Leg Adjacent to the Tongue Socket

design incorporating various desirable features. From the primary form of simple platform truck modified types with flaring side boards and box or rack equipment can be readily built up. The construction of this truck features roller bearing wheels of large size under the load to insure easy running qualities and a detachable jack tongue with roller bearing lead wheel. A supporting foot is provided at the front end of the truck to take the load when the tongue is detached.

The jack tongue is an especially convenient feature. Where a number of trucks are in service one tongue for each four or five has been found to be a good proportion. Being removable, the jack tongue is out of the way when the trucks are not being moved, a real convenience in the narrow aisles of a machine shop when the truck is being used as a temporary storage for parts to be machined and is available for the moving of other trucks. The tongue may be coupled with the truck at any angle and the truck may be turned out of line or from the position in which it is, through a very small radius. The tongue is made of malleable iron and steel, involves little occasion for repair and is inexpensive. The lead wheel is of the same type as the truck wheels except for being a little smaller.

The truck boxes and side boards are heavy and of durable wood and are secured in place with malleable corner irons and bolts. When worn out the wood parts are readily renewable. For foundry use a platform, 20

x 36 in., with side boards, 30 x 46 in., is a desirable size and for factory use a platform, 20 x 42 in., with a box to fit, 16 in. deep. In shops where quantity production of duplicate parts is the practice these trucks lend themselves admirably to the methods now generally used which provide for grouping machines in the order of consecutive operations. The partly finished pieces can be conveniently laid down on one of these trucks and picked up by the machine operators as they pass from one machine to the next and when finished can be as conveniently hauled away.

Other types of this truck are also being manufactured for special uses, as the handling of coke for cupola charging or pig iron and sprue for charging into air furnaces where overhead handling equipment is installed.

## Automatic Machine for Grinding Hobs

The latest type of special grinding machine to be added to the line designed and built by the H. E. Harris Engineering Company, Broad Street, Bridgeport, Conn., is an automatic hob grinding machine. It is pointed out that with this machine it is possible to secure more



Hobs of All Types Are Ground without Any Attention on the Part of the Operator by this Automatic Hob Grinding Machine



A Row of Trucks in Use for the Storage of Partially Finished Parts

accurate and uniform work than can be turned out by one operated by hand and in addition the machine possesses the advantage that it operates at a certain fixed speed and saves the operator's time. Other applications of the machine are for grinding flutes in taps and a number of similar purposes, while by adding an extra attachment it is possible to grind either right or left hand spirals as well as straight flute hobs.

The work table of the machine moves backward and forward at a uniform rate under the influence of a cam on a camshaft located in the body of the machine. This shaft is operated by a wormwheel which in turn is driven by a belt from the countershaft. For convenience in setting up the work a handwheel is provided to give a reciprocating motion of the table.

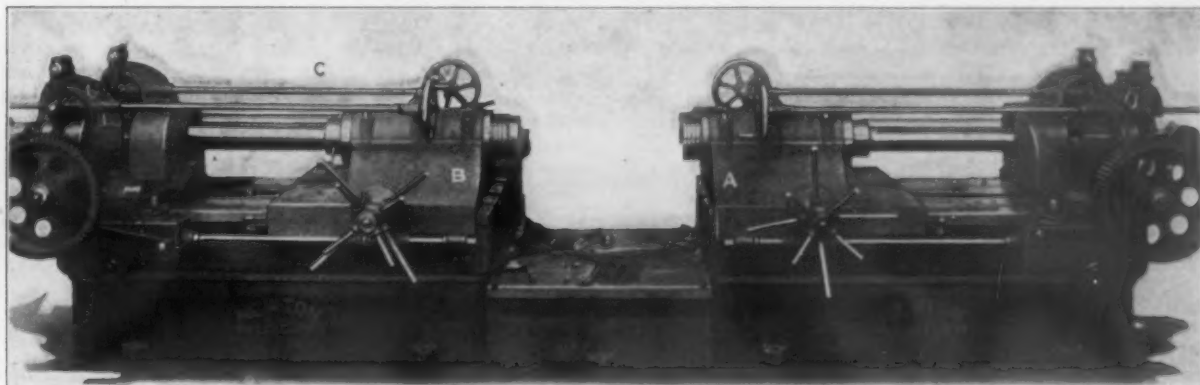
The indexing of the work is automatic and is operated by the camshaft which reciprocates the table. It is pointed out that the indexing is positive and ac-

curately spaced, so that there is no variation in the work produced. A guard covers the indexing mechanism, and is relied upon to keep it dry at all times. An idler pulley working against the slack side of the belt is provided to take care of unevenness in tension, and a setting block is furnished for setting the work in the proper position. When this is done the block drops out of the way and leaves the work supported at its outer end by a rigid center carried on a swinging arm that is capable of clamping.

The grinding wheel spindle of the machine is mounted in large ball bearings on a horizontal slide which is adjusted with a micrometer screw. This slide in turn is mounted in a vertical one also having micrometer screw adjustment, this arrangement, it is pointed out, enabling the wheel to be positioned accurately either axially or perpendicularly. This construction enables the machine to accommodate any size or shape of wheel within its range and to grind any required degree of rake to the face of the teeth. The grinding is done under flooded lubrication, the wheel being covered by a close-fitting guard. The grinding lubricant is pumped from a tank in the lower part of the machine into this guard and falls to the pan-shaped work table from whence it drains back into the reservoir and is used over and over again. The ball bearings of the wheel spindle are adjusted to give a wheel which runs steadily without end thrust.

### Four-Spindle Motor Boring Machine

The Newton Machine Tool Works, Inc., Twenty-third and Vine Streets, Philadelphia, Pa., has developed a new design of four-spindle boring machine. This is



The Axle and End Bearings and the Field Pads of Cast-Steel Motors for Street Cars and Mine Locomotives Are Bored at One Setting by This Four-Spindle Machine

designed for use in connection with the boring of street car and mine locomotive electric motors for the axle and field bearings, the armature shaft and bearing ends.

The machines are all built along the same general lines, although in some cases back gears in the drive of the main end bearing boring spindles are omitted and this is also true of the rapid traverse to the spindle saddles, gear feed boxes, hollow or solid spindle noses and auxiliary boring spindles inside the sleeves. The operating levers are varied in location according to individual requirements.

All spindles or sleeves have exterior threads on the nose for carrying cutter heads or boring bars. A worm and wormwheel drive with an independent clutch is provided for each spindle which revolves in a capped bushed bearing. The main spindles A and B have fixed positions in their saddles and their alignments coincide, although in special cases, however, the latter has been equipped with a large sleeve having a threaded nose to carry the boring heads and arranged with drift key slots to maintain the spindle at protrusion distances suitable for the location of the field pads to be bored. In such cases the boring bars are screwed into the nose of this spindle while the other is hollow bored and bushed to serve as a support to the outer end of the bars.

The axle bearings are bored by the spindle band C

which coincides in vertical alignment with the corresponding one on the other side of the machine. Its saddles and rear driving gear brackets, however, are adjustable crosswise to give various desired center distances within the range of the machine. To facilitate the accurate duplication of center distances provision has been made for the use of spacing blocks.

The preferred form of drive for these machines is a single driving motor on each end of the two adjacent spindles. If desired, however, separate motors for each spindle can be employed or a belt drive can be substituted.

### Hot Bed Practice in Rail Mills

That improvements should be made in hot bed work in rail mills is emphasized by Dr. P. H. Dudley, consulting engineer, rails, tires and structural steel, New York Central Lines, in an addendum to his report on transverse fissures in the heads of rails published at length in *THE IRON AGE* of Aug. 17, 1916. The report and the addendum have now been printed by the American Railway Engineering Association as report No. 59 to the Rail Committee of that association.

He asserts of course that the supports in the straightening presses should be widened to minimize the pressure of the gag in straightening rails of heavy and stiff sections. He reiterates also that rolling should be maintained with that regularity that will prevent rails being rolled too cold.

He urges particularly in this addendum the spacing of rails about 6 in. apart on the hot bed instead of the common method of bunching, leaving the relatively massive head close to the base section of the neighbor-

ing rail. His records show that the melts of basic open-hearth steel which are developing induced interior transverse fissures of the two types into which he divides them were rolled principally by "direct rolling" on days when the atmospheric temperatures were near or below freezing. In short, he regards the temperatures at time of rolling as important factors in cooling the rails on the hot beds. He has some further investigations in progress, covering rails rolled in the winters of 1892, '93 and '94, and since that time in service, and argues that the actual proof of service is more valuable to the railroads of the United States than the opinion which has been expressed that every rail, no matter how well designed and made, is subject to the development of interior transverse fissures under the present wheel loads.

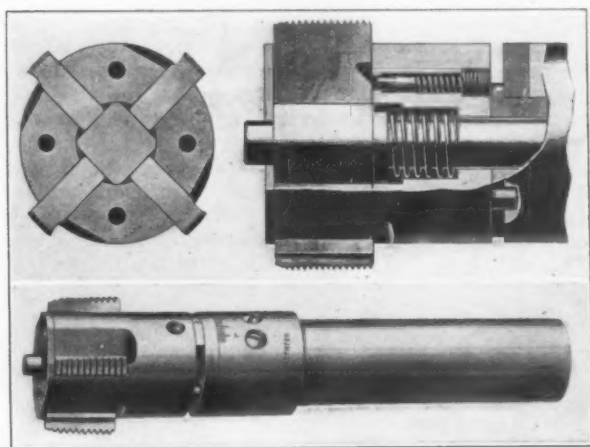
The Blackburn-Smith Corporation, 105 West Fortieth Street, New York, through the purchase of the filter department of James Beggs & Co., has acquired all patents, etc., of the Blackburn-Smith feed water filter and grease extractor and the Blackburn-Smith sewage ejector system. The engineers and agents previously identified with these products have been engaged by the new corporation and will in future work under the direction of Irwin H. Kaufman, vice-president, who has supervised the manufacture, sale and installation of the Blackburn-Smith filter for the past ten years.



## Collapsible Tap for Turret Machines

A new collapsible, adjustable tap designed for use on turret head machines, finishing lathes, screw machines, bolt threading machines and in fact for any line of work where threads to 1 in. or larger in diameter are to be tapped, has been brought out by the National-Acme Mfg. Company, Cleveland, Ohio. One of the most important features of this tap is that the body and shank are no larger in diameter than the cutting diameter of the chasers, so that instead of the tapping operation being limited by the length of the chasers, there is no limit to the depth to which work can be tapped. The tap has but few parts.

The chasers located in slots in the front face of the body or head are held in the slots by a disk screwed to the face of the head. Through the center of the body a hole is bored lengthwise of sufficient size to accommodate a core. The front side of this core has flattened edges, one for each cutter blade. The front end of the core is cylindrically formed and projects through the disk. The front portion of the bore of the body is of enlarged diameter to provide space for housing a



The Chasers in This Collapsible Adjustable Tap for Threading Work up to 1 In. in Diameter Are Located in Slots in the Front Face of the Body and Are Collapsed by a Tripping Pin Bearing Against the Disk Holding the Chasers in Position

spring that bears against the corners of the flattened part of the core and against the bottom wall of the enlarged bore. The body also has a lengthwise bore for each chaser. Adjacent to the chaser slot is a bore of small diameter for receiving the tripping pin, the end of which projects into a V-shaped recess formed in the end of the chaser. The next section of the bore is of larger diameter to provide a shoulder for the tripping pin and a chamber for housing a spring which exerts a pressure against the head of the tripping pin and holds it firmly against the recess in the end of the chaser. The opposite end of the spring bears against a set screw threaded into the third section of the bore of still larger diameter.

The shank of the tap has a hub section on the front face of which is a central bore to receive a tripping sleeve dog. This has a groove around its circumference and at one end a flange that abuts against the face of the hub. It has a bore of sufficient size to permit the passage of the core shank. The tripping sleeve dog is secured to this shank by a pin. The hub has two radial openings or bores to receive binding screws, the ends of which project into the groove of the tripping sleeve dog and hold it against rotation within the bore of the hub. The flange of the tripping sleeve dog is cut away at opposite sides to leave two sections that act as stop members against which two driving pins in the rear face of the body abut at the proper time for eliminating the rotation of the body relative to the hub. The front face of the hub is also provided with two radial slots with which the driving pins cooperate for setting the tap in an operative position.

The chasers are in a withdrawn position when the driving pins are withdrawn from the slots in the hub and in contact with the stops and the flat sides of the

core are in contact with the backs of the chasers, which are then located by pins projecting into the recesses in the chasers under spring pressure. When the tap is to be set to its greatest diameter the body is turned relative to the hub by a movable handle until the driving pins are brought into position so that the pressure of the springs will force the body backward and the driving pins will enter the recesses in the hub. At the same time the body has been rotated with relation to the core so that the corners of the flat section of the core engage the backs of the chasers, forcing them outward and holding them in that position. When the tap is open the V-shaped slots in the chasers permit their pins to be forced back against the action of the springs until the pins are almost withdrawn from the recesses and the pressure of the springs against the pins holds the cutters firmly against the disk at the end of the tap.

The tap can be adjusted to cut any diameter of work between the smallest when the chasers are in a withdrawn position and the largest when the chasers are projecting out to their full capacity by loosening the adjusting binding screws which project through the hub into the sleeve groove, and by means of the slot in the front end of the core revolve the core in either direction. In this way the relation between the corners of the flat core section with the backs of the cutters is changed. This is clearly shown in one of the illustrations. A greater range of capacity can be provided by having cores that will force chasers further upward than can be done with a flat-sided core.

When the turret travel is stopped the tap continues to cut until it has reached the required depth. The cutting lead will then disengage the driving pins and travel with the rotation of the work until it has reached the tripping stop when the chasers will collapse, releasing them from the work. Thus its operation is similar to that of the company's opening dies. Among the advantages claimed for this tap in addition to those enumerated above are that the chasers are supported their entire length on the core and no extra parts except left-hand chasers are required for left-hand threads.

For use on a drilling or chucking machine the tap is furnished with an outside trip which insures collapsing at the given depth and thus gives a uniform depth of thread regardless of any irregularity on the face of the casting.

## The Failure of Brass

"Failure of Brass—Initial Stress Produced by the Burning-in of Manganese Bronze," is the title of Technological Paper No. 84 by Paul D. Nierica and C. P. Karr of the U. S. Bureau of Standards. An investigation has been made of the initial stress produced by the burning-in, without preheating, of constrained parts of castings of manganese bronze. Results have shown that, in general, tensile stresses will be produced within the burned-in area equal in value to the true elastic limit of the material. The conclusion is drawn that burning-in of such material should not be practised without thorough preheating and subsequent annealing of the whole casting.

In Technological Paper No. 83 of the U. S. Bureau of Standards, entitled "Failure of Brass—Effect of Corrosion on the Ductility and Strength of Brass," by Paul D. Nierica, associate physicist, a study has been made of the effect of tensile stress on the electrolytic solution potential of brass to various solutions, the results indicating an increase of e.m.f. of about 0.1 millivolts for 10,000 lb. per square inch of stress. An explanation is given, based on this effect, of the decreased ductility and strength exhibited by brass when corroded while under tensile stress. The growth of fissure in brass under such conditions is described.

The Beloit Iron Works, Beloit, Wis., has taken the contract to build a fifth paper mill unit for installation in the addition now being erected at Green Bay, Wis., by the John Hoberg Paper Company. The machine will have a 132-in. face, and is one of the largest ever constructed.

# Germany's Supplies of Ferromanganese

## The Situation as to Manganese Alloys Before and Since the War Began—The Question of Substitutes—Salient Points in Furnace Practice

BY EDWIN F. CONE

**S**PECULATION as to Germany's war supplies of manganese alloys for steelmaking purposes has been and is still active in this and other countries. It is known that the steel output has grown since the war started until it is now nearly 85 per cent of what it was in 1913, the record year. It is also known that the steel made contains manganese, as judged by British analyses of shells made over a year ago. There were some indications then that the manganese content was below normal—at least in certain cases. At any rate, it has hitherto been believed that proper steel could not be made without the use of manganese in some form. Whether Germany still has sufficient manganese supplies or is using some substitute effectively is therefore an interesting metallurgical question.

### COMMENTS ON THE GERMAN SITUATION

Some of the interesting speculations that have appeared in various journals follow. A British translation of an article in the *Frankfurter Zeitung* last spring was in part as follows:

There is no evidence that the German steel production has been adversely affected either in quality or quantity by a scarcity of manganese ore or ferromanganese. When the war broke out considerable stocks of manganese ore were held in Germany and some of the works have not entirely depleted theirs. The country also itself produces plenty of ore which, though not altogether a substitute for Caucasian or Indian ore, affords a partial substitute. This is the brown and red Nassau iron ore and the Siegerland spathic ore. Apart from the Siegerland ores, the German home production of manganese can in case of need be raised to 300,000 tons annually. The Siegerland mines yield about 1½ million tons yearly of spathic iron which has a manganese content of about 12 per cent.

The deposits referred to are suitable only for conversion into spiegeleisen or into a manganese alloy containing 30 to 35 per cent manganese or less.

### A Costly Substitute

Comment appearing in the engineering supplement to the *London Times* early this year was to the following effect:

A paragraph has recently been circulated to the effect that Germany has solved the problem of a substitute for ferromanganese for the production of steel, that the substance can be produced in large quantities from internal raw materials, and that the process will make Germany independent of imports. This is no news to the metallurgists of Sheffield, who understand exactly what the statement means and are not inclined to be over-impressed by it. \* \* \* The probability of Germany getting supplies of ore at all grows more remote and the chemists have found it necessary to go into the question of obtaining a substitute, however expensive. They have experienced considerable difficulty owing to the fact that the constituents necessary to provide anything in the place of manganese cannot be obtained without serious outlay. The announcement which is now made is, in the opinion of leading manufacturers in this country, but a restatement of a case which has previously been put forward and the substitute is believed to be most probably some alloy of aluminum and silicon. This would be used to supplement the limited proportion of manganese existing in the German native ore. According to one prominent Sheffield steel maker, this is quite feasible but very much more expensive.

### Doubt As To the Substitute

In an issue of the *London Iron and Coal Trades Review* early this year was the following statement:

Following the announcement by the enemy about a year ago that copper was no longer indispensable in the manufacture of their munitions because an efficient substitute had been discovered, we are now informed from the same quarter

that the problem of finding a substitute for ferromanganese in the manufacture of steel has been solved. It is claimed that the new material can be made from elements abounding in profusion in the country and that already plants are at work upon its manufacture, while others are in course of construction for the same purpose. \* \* \* We are inspired with some suspicion of these revolutionary discoveries announced from time to time. Latest accounts in Germany indicate that, despite the alleged remarkable properties of the copper substitute, the search for that metal is still unabated. It is, however, not at all difficult to devise a process whereby ferromanganese can be made in large quantities from the low grade ores which Germany possesses. The point is, at what price per ton can this material be produced.

The statement in the latter part of this quotation is to be questioned, because thus far it has not been regarded metallurgically possible to make standard ferromanganese or even a manganese alloy relatively high in manganese from low-grade manganese ores.

Another writer in one of the British trade papers has this to say regarding the statement that the new material can be made from elements abounding in profusion in Germany:

While we do not accept these assurances quite at their face value, there is no doubt an element of truth in them. A spiegeleisen running as low as 10 per cent in manganese—the Germans can make a great deal of this—will contain only 5 per cent of carbon and therefore in making a steel containing about 0.40 per cent of manganese only 0.20 per cent of carbon is introduced. Clearly in shell steels there is no insuperable drawback about this.

While such statements do not necessarily constitute evidence that there is no shortage, it certainly is not safe to assume that the steel output of Germany will be materially restricted by a scarcity of manganese or any other element. When a nation's existence is at stake many expedients become possible which in normal times would be impracticable.

In another issue of the *London Iron and Coal Trades Review* there appeared not long ago the following comment:

\* \* \* But while it is known that Germany is suffering from a shortage of ferromanganese, it must be remembered that a large proportion of her steel output, probably larger now than previously, is basic Bessemer material for which the use of spiegeleisen instead of ferromanganese is suitable. Germany has no serious supplies of manganese ores proper, but she has certainly an ample native supply of manganiferous iron ore; the output of such ore running from 12 to 30 per cent of manganese was 300,000 tons in 1912 and of ore containing up to 12 per cent of manganese nearly 3,000,000 tons.

### German Manganiferous Ores

In a later issue of the same paper we note the following:

An item has appeared in German newspapers to the effect that the German substitutes for imported manganese ores are Nassau brown ore and also Styrian (Austria) manganese ore. If the Siegerland manganiferous ores are left entirely out of consideration the Germans have a production, it is stated, of 250,000 to 300,000 tons a year, whereas the imports from the Caucasus and India formerly amounted to about 500,000 tons yearly. The mines in the Siegerland produce about 1,750,000 tons of manganiferous iron ore annually which has an average manganese content of 12 per cent and which it is claimed fulfills the purpose.

The 800,000 tons referred to embraces ore of about 30 per cent manganese—not high-grade ore.

Germany has always been entirely dependent on foreign countries—India, Russia and Brazil—for her supplies of high-grade manganese ore from which alone can 80 per cent ferromanganese be made. The empire, like the United States, contains practically no deposits of such ore, but imports before the war ran to enormous



proportions. The total for the five years previous to 1914 was far in excess of the normal demands of the German steel industry.

#### IMPORTS AND EXPORTS OF MANGANESE ORE

The actual condition as to imported high-grade manganese ore is shown by the following data taken from German official statistics of imports and exports for the five years preceding the war:

<i>German Imports and Exports of High Grade Manganese Ore, Metric Tons</i>			
Year	Imports	Exports	
1909.....	384,445	22,436	
1910.....	487,721	22,728	
1911.....	420,709	27,395	
1912.....	523,254	21,513	
1913.....	680,371	25,221	
Total.....	2,496,500	119,293	
Exports .....	119,293		
Available for German consumption.... 2,377,207			

If the seven months preceding the war are also taken into account—January to August, 1914—it is fair to estimate that at least 250,000 tons more of ore was imported and perhaps 10,000 tons exported. Adding 240,000 tons to the total as of Jan. 1, 1914, we have 2,617,207 tons of high-grade manganese ore as representing the amount available for use in Germany in the five years and seven months previous to the war and since. Russia and India supplied 82.1 per cent of these imports in 1909, 83.2 per cent in 1910, 83.2 per cent in 1911, 86.6 per cent in 1912 and 91.27 per cent in 1913.

Experience has demonstrated that the yield of ferromanganese from high-grade ore, based on a comparison of ore imports and ferromanganese production over a long period, is 40 per cent of the weight of the ore. If this be taken as a basis, then the total amount of ferromanganese possible from the available manganese ore is as follows:

$$2,617,207 \text{ tons} \times .40 = 1,046,882 \text{ tons ferromanganese.}$$

#### MANGANESE ORE IN BLAST-FURNACE BURDENS

This apparent supply of over 1,000,000 tons of ferromanganese has not all been used in the steel industry of Germany. Some of the factors which have cut into this supply are the following:

1. *Exports.*—While considerable manganese ore came from Russia, a good deal was sent back as ferromanganese. Statistics show that these exports, together with those to other countries, averaged 57,500 tons per year, which would bring the total for the five years before 1914 to 287,500 tons. To this must be added the estimated exports for the first seven months of 1914, which are 33,600 tons. The total ferromanganese exports can be safely put at 321,000 tons from Jan. 1, 1909, to Aug. 1, 1914, or five years and seven months.

2. *Consumption in Blast Furnaces.*—The basic Bessemer or Thomas pig iron of Germany, as made from available iron ores previous to the war, had a phosphorus content of only about 1.50 per cent. This is not sufficient, according to German practice, for use in making basic Bessemer steel, and it has been customary, therefore, to make up for the lack of phosphorus by using sufficient high-grade manganese ore to bring the manganese content in the final pig iron to at least 1.50 per cent. Manganese ore necessary to do this involved a cost of about 50c. (2 marks) per ton of pig iron produced. In the five years from 1909 to 1913, and in the seven months to Aug. 1, 1914, not less than 60,000,000 tons of basic Bessemer pig iron was produced in Germany.

The German practice also involves the incorporation of 4 to 5 per cent of manganese in the basic open-hearth pig iron. To accomplish this considerable manganese ore has been necessary, depending on the manganese content of the iron ores from which this is made. At least 7,725,000 tons of such pig iron was consumed in basic open-hearth steel making in Germany in the five years and seven months previous to August 1, 1914.

The metallurgical reason for so large a manganese content in Germany's basic open-hearth pig iron is the belief that a better steel is the result of the presence

of the manganese. This is without doubt correct, and the practice is gaining favor in the United States in many quarters.

It is also the practice in Germany to charge more scrap and less pig iron, about 75 per cent of the former and 25 per cent of the latter, in basic open-hearth practice, the higher manganese content being regarded as making such practice successful. In this way Germany is enabled to consume her large surplus of basic Bessemer scrap, the basic Bessemer steel output comprising 55 to 60 per cent of the total. The presence of considerable manganese in refining such highly oxidized scrap is not only helpful but necessary to the successful disposition of this scrap. These conditions are not met with in American practice.

The writer is reliably informed that all the manganese necessary in the two grades of German pig iron mentioned came entirely from the use of Russian manganese ore before the war. What the practice has been since the war started is not known. Conservation of high-grade manganese ores has been imperative. It is likely, however, that the foregoing practice has had to be radically changed unless the use of high manganese slags and low manganese iron ores has made it possible to compensate in part for the use of high manganese ores. In any event, the previous high standard has probably been lowered of necessity.

#### GERMANY'S CONSUMPTION OF FERROMANGANESE

Turning to the consumption of ferromanganese in Germany, we have to consider that this alloy is not really necessary in most steel made by the Bessemer process, spiegeleisen being used there. The amount of steel so made may be largely left out of consideration in estimating the ferromanganese consumption. It is a fair assumption that the average consumption of ferromanganese is about 17 lb. per ton of steel. On this basis the following table gives the estimated consumption of high-grade ferromanganese in Germany for the various periods under consideration:

*Ferromanganese Consumption in Germany in Metric Tons*

Period	O.H. Crucible and Electric Steel	Ferromanganese Consumed	Totals
1909-13 (5 years).....	31,564,906 × 17 =	243,467 }	259,088
1914 (7 months).....	2,025,256 × 17 =	15,621 }	
First war year.....	5,635,361 × 17 =	43,467 }	79,084
Second war year.....	4,617,735 × 17 =	35,617 }	
Total.....			339,172

It will thus be seen that at least over 259,000 tons of ferromanganese was consumed by Germany in the period named up to Aug. 1, 1914, and that up to Aug. 1, 1916, not less than 79,000 tons was necessary. This is assuming that spiegeleisen only was used in the Bessemer steel made. It is possible that in making low carbon Bessemer steel some high percentage alloy was necessary. If so the consumption would be higher.

#### Recapitulation

Recapitulating the foregoing analysis, we have the accompanying estimated statement of the manganese situation in Germany up to the war, Aug. 1, 1914.

It is impossible to figure accurately the manganese ore consumed in Germany, either in blast-furnace burdens or in regular ferromanganese furnaces. An English authority states that German statistics show that 500,447 tons of manganese ore, containing more than 30 per cent manganese, was consumed in blast furnaces in 1912 and 622,485 tons in 1913. This, of course, includes both ferromanganese and the pig iron for which manganese ore was used. Contrast with this the imports of 523,254 tons and 680,371 tons of manganese ore in 1912 and 1913 respectively. It is known that Germany produces practically no ore with above 30 per cent manganese.

Assuming that the following estimate is approximately correct, and that Germany's practice as to the use of manganese ore in blast furnaces and her consumption of ferromanganese were normal up to the war's inception, Germany had ore or ferromanganese on Aug. 1, 1914, equivalent to at least 66,794 tons. In the two war years, Aug. 1, 1914, to Aug. 1, 1916, there was need theoretically of 79,084 tons of ferromanganese



for the open-hearth steel made in that period. This would leave none of the alloy on hand Aug. 1, 1916, if there were no other demand for it and if the foregoing analysis is correct. It is possible, however, that some ferromanganese has been necessary in making Bessemer steel, and that therefore the shortage of available ore or alloy was still greater on Aug. 1, 1914.

Estimated Statement of the Manganese Situation in Germany

High Grade Manganese Ore:	Metric Tons	Metric Tons
Imported, 1909 to 1913 inclusive....	2,496,500	
Exported, 1909 to 1913 inclusive....		119,293
Imported in 1914 to Aug. 1.....	250,000	
Exported in 1914 to Aug. 1.....		10,000
Totals.....	2,746,500	129,293
	129,293	

Available for consumption in 5 years and 7 months..... 2,617,207

Ferromanganese:

2,617,207 tons of ore multiplied by .40	1,046,882
Consumed in steelmaking to Aug. 1, 1914, 5 years and 7 months.....	259,088
Exported to Aug. 1, 1914, 5 years and 7 months .....	321,000
Total .....	580,088
Balance on hand Aug. 1, 1914, not taking into account manganese ore consumed in blast furnace practice	446,794

If the amount of high grade manganese ore consumed in blast furnaces to raise the manganese content in pig iron be put at 1,000,000 tons in the 5 years and 7 months (a low estimate if, as above stated, these manganese additions to pig iron represent 2 marks extra cost), then the manganese ore available for conversion into ferromanganese would be

	Ferromanganese
2,617,207 — 1,000,000 = 1,617,207 × .40 =	646,882 tons
Consumed and exported.....	580,088 tons
Balance in hand Aug. 1, 1914.....	66,794 tons

Regarded from the most favorable viewpoint, Germany's need of high-grade ferromanganese was probably very pressing within at least a year after the war started. It has come to the knowledge of the writer from a metallurgist who was at several of the large German steel plants 10 months after the war started that at that time the supply of standard ferromanganese was very low and expedients of various kinds were being tried as a substitute for the regular alloy and for the manganese ore. This situation fits in with the conditions as calculated above.

USE OF SLAGS CONTAINING MANGANESE

Large quantities of furnace slags exist in Germany containing varying percentages of manganese. It is known that quantities of these are being used in the regular blast-furnace burdens, instead of manganese ore, to raise the manganese content of the pig iron. To what extent some of the higher manganese acid slags are being used for making manganese-iron-silicon alloys in electric furnaces is not known. While an expensive operation, its success and efficiency is possible and has been demonstrated metallurgically in other countries.

THE LOW MANGANESE ALLOYS AND OTHER SUBSTITUTES

It is understood that German steelmakers have found a successful way to use a 30 to 35 per cent manganese alloy, of which large quantities can be produced from available manganiferous iron ores. Probably this is the principal substitute they are using. There is not likely to be any mystery about the reported substitute. There is no reason why, in shell, rail and most other steels, such an alloy could not be successfully used. In the lower carbon and special steels it is not improbable that a special alloy, such as silicon-aluminum, ferro-silicon, or a special silicon-iron-manganese alloy is being used in regular steels for partial deoxidation and cleansing. The invention of any mysterious substitute is not likely. There is no known element,

analogous to manganese or otherwise, which bestows on steel the same properties or benefits. German, or even American inventive genius, may discover such an agent as the industry develops. Whether as good steel is being made or can be made under the present conditions in Germany is a question. Certainly more skill is necessary.

The use by the Germans of a calcium-silicide is also possible as a partial substitute for manganese. Calcium has been tried in the United States in this connection, but not extensively—partly because there was no necessity for it, and this is characteristic of Americans. Speculation points reasonably to either calcium-silicide or a 30 per cent manganese alloy as the probable substitutes as the war progressed.

The apparently impossible not infrequently turns out to be possible. If Germany's need for manganese is really more serious than has been outlined and if chemical and metallurgical research have really evolved a substitute, carrying with it radical changes in our ideas and in the practice in steel making, the literature after the war will present a very interesting discovery. The problems of the war are slowly bringing new developments in this country, and no doubt equally or more important ones in Germany.

THE LESSON TO THE UNITED STATES

A study of this analysis of Germany's situation as to manganese supplies under war conditions should be impressive to American steelmakers. At our present rate of steel production, 43,000,000 tons per year or upward, at least 304,000 tons of standard ferromanganese is necessary theoretically. To produce this amount of alloy over 760,000 tons of high-grade manganese ore is required. To us, even more than to others, is the need of manganese vital. Not only is our steel production larger than that of any other country, but the proportion of steel requiring ferromanganese is still greater. The question of a substitute is not only a more serious problem in these circumstances, but the fact that our supplies of manganese ore come entirely by sea from foreign lands is a weakness. Supplies of native manganiferous ores are not adequate to meet the situation should our regular supplies be cut off.

U. S. Electro Galvanizing Company Expanding

An extension of the U. S. Electro Galvanizing Company's plant, compelled by the growth of its business, has been started with the purchase of an additional building at 278-284 Park Avenue, Brooklyn, N. Y. This building will be devoted to the manufacture of automatic machinery for nickel plating and electro galvanizing, of which the company has six patented types. A laboratory for the testing of new solutions, materials and plating and cleaning methods is being installed. Job galvanizing will be confined to the building at 1 to 9 Park Avenue. The company, since 1896, has been a pioneer in the invention and development of automatic handling devices for cleaning, electro plating and electro galvanizing various material, and with the added facilities a number of new apparatus which are now in their inception will be perfected.

According to the United States Geological Survey, about 232 tons of stream tin was produced in Alaska in 1916. Of this about 162 tons came from the York district, where two tin dredges were operated, and a third was working on placer ground carrying both tin and gold. Developments were also continued on the Lost River lode-tin mine. The rest of the concentrates were recovered incidentally to placer-gold mining in the Hot Springs district of the lower Tanana basin.

The Link-Belt Company fired the fifth furnace at its Belmont plant, Indianapolis, Ind., about the middle of December. The addition of this furnace materially increases the capacity for producing malleable Link-Belts for conveying, elevating and power transmission purposes.

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# THE IRON AGE

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## Time to Act for the Webb Bill

As our Washington correspondence shows, the passage of the Webb bill through the Senate is by no means to be taken for granted. There are signs of maneuvering for delay which indicate a purpose to work the measure over into the crowded latter days of the session. It seems strange that a bill which it was generally agreed would help the business of the country and injure no domestic interest, should be put in peril by the obstructive efforts of a minority. There is no claim that sentiment throughout the country has changed or that there is any popular demand for the defeat of the bill. It is a case in which the opposition, well appreciating that it is going in the face of public opinion, is determined to use every technical expedient to carry its point.

It is not necessary, in view of the full consideration the proposal has had in the past year, to go again at this time into argument for this declarative piece of legislation relative to co-operation in foreign trade. The Federal Trade Commission cannot be accused of bias. Its investigation was long continued and thorough. All the work for the bill has been done in the open. It is pertinent to ask what foreign interest is at work to prevent the more effective marshaling of the business energies of the country in extending our exports. Business men have a week within which to express their mind to members of the Senate, and no time should be lost in doing this.

## Industrial Census of 1916 Needed

The Director of the Census has asked for Congressional legislation authorizing him to take a census of the quantities and values of domestic manufactures for the present year. Under the prevalent system of census compilations, the five-year interval from the last collection of manufacturing statistics, which was for the year 1914, would fix 1919 as the year for again "taking stock." The year just ending, however, has been such an eventful period for American industries, having been a full twelvemonth of the most active operation of all kinds of manufacturing establishments, that it would be most gratifying to know precisely what has been accomplished. The figures would undoubtedly be stupendous, far exceeding those of any previous year, and perhaps setting a mark

which may not be approached for some years to come. To wait until 1919, and take the census of that year, merely because it will be at the end of a five-year period, might perhaps take us into a time of trade depression, such as that of 1914, and the exhibit for the year would again have to be treated apologetically. By all means, let us have a census for 1916, so that we will know what this year has to show for the expansion of our industries. We know that our domestic trade was the largest in our history and we have the figures to prove that our export trade was far greater than that of any previous year, but we need authentic figures for the entire trade of the country. If the census should be authorized, however, it is to be hoped that the work can be completed within a few months after the close of the year.

## Rolling Stock Scarcely Obtainable

A current news item is that the Paris-Orleans Railway has ordered 50 locomotives from the American Locomotive Company for delivery in November, 1917, while the French State Railways have ordered 100 locomotives from the same company for delivery in January and February, 1918. Presumably other locomotive builders offered still poorer deliveries. France is not ordering locomotives now because she has suspicions that a year hence they may come in handy. Whatever may be said about the slowness of American railroads in placing orders for locomotives, the fault was committed long ago. Lately it has been impossible to place orders for anything like early delivery. It is not that the locomotive shops are unable to make early deliveries because they have sold such large numbers of locomotives, for current reports would indicate that not as many as 5000 locomotives have been ordered all this year—about 60 per cent domestic and 40 per cent export—while the *Railway Age Gazette* statistics show only 1573 locomotives ordered by the railroads of North America in 1915, and show, also, that as long ago as 1907 about 7000 locomotives were built in a year. Locomotives exported have been as follows:

1913 .....	491
1914 .....	269
1915 .....	621
1916* .....	539

\*Ten months only.



A still more striking comparison can be made with respect to freight cars. The orders this year appear to have totaled about 160,000 freight cars, domestic and export, while last year's domestic orders were given by the *Railway Age Gazette* at 107,796 cars. In 1913 the total of cars built in the United States and Canada was 207,684, and in 1907, the record year, 284,188 cars.

Evidently a part of the slow deliveries of rolling stock is due to difficulty in securing raw materials. Another difficulty is the securing of parts. Car and locomotive manufacturers, as well as those from whom they buy, have other urgent business arising from the war. They have too many irons in the fire, from the viewpoint of the railroads.

### Compelling Workers to Earn More Money

Among the various elements of premium and bonus which the people at large, including the average Congressman, do not understand is the rule that in the planning preliminary to displacing hourly wage or piecework, the engineer shall figure to give the workman more money for his time than he has been earning previously at the same task. The usual practice is to provide a 25 per cent advance. The experts determine the time required for each piece of work under practical shop conditions—which time is far greater than the theoretical time—and also plan so that the worker may obtain the greatest possible production without increasing unduly his physical and mental effort. All these things having been determined, the rates are fixed with the deliberate purpose that the employee's earnings shall be greater by the prescribed percentage. If this be 25 per cent and he has been getting \$12 weekly, the intention is that his future pay envelope be \$15; if he has earned \$15 he is to get \$18.75. In fact, the owner demands that the man receive more, because the more he earns the more he produces, and the more he produces the more the equipment earns. If, under the advantageous conditions in operating tools and handling work which are effective coincidentally with the starting of the new system, he cannot earn more than he has been getting, then he is rated as an undesirable whose place should be filled.

The owner who adopts a premium system is the kind that realizes that it is unprofitable in the long run to overwork men, because to do so increases the percentage of idle hours due to sickness; increases the accident hazard, since men are more likely to be hurt when they are fagged than when their vitality is normal, and also increases the always expensive factor of transient employment.

### Branch Plants in Canada

Canadian commercial papers are discussing the continued tendency of United States manufacturing establishments to locate branches on their side of the border. Prior to the European War there were about 450 of such branches in Canada, and since its outbreak about 50 more have been opened, representing a total investment of at least \$150,000,000. An impetus has been given to the movement, according to the *Toronto Monetary Times*, by the possibility of the enactment of preferential tariffs among the Entente Allies and the Dominion

after the war. In such an event the United States manufacturers in Canada expect to be regarded as Canadian manufacturers and thus participate in the benefits of this tariff legislation. They will also secure a share of the growing Canadian home trade.

### The Plant Improvements to Come

When demand slackens and pressure on the machinery of production lightens, we may look for an active period of plant beneficiation. Money will be available for the things that promote efficiency. The factories are legion where machines are poorly placed, where materials in process are toted hither and thither, and in which there are points of congestion which cause loss of time, money and temper. But when the call is incessant for output, and machines, men and equipment can be idle only for short intervals, improvements in the existing order get scant consideration. Where plants are extended to meet large sales possibilities, full provision is made for economy and speed in manufacture. But in many cases long-existing departments, for which money could not be spared formerly, could be rearranged so as to make further plant enlargement unnecessary.

It is the real misfortune of many industrial establishments that the flood of business has been so overwhelming. Had the volume been spread over a longer period, the opportunity might have been seized to study out the situation along ideas of modern management, without involving the much greater capital charges of a new structure. Both by reducing the cost of individual operations and by the handling of larger outputs great economies are possible to going plants, simply by giving to the manufacturing problem as much attention as, for example, is given to the problems of selling.

### Plant Office Buildings Get Attention

Another chapter of industrial history is now being written. In the present era of domestic prosperity many factories whose growth through the years had given them little above the safe margin have at last found themselves. Having become established, they begin to take on the air of permanence. Just as communities develop civic pride after the period of settlement and the ensuing steady growth, and add art to the utilitarian, so new factory buildings of going concerns are no longer regarded as mere shelters for expensive machines, but as attractive habitats of a business, pleasing inside and out, and exhibiting a condition of stability which reacts on the community.

One of the late manifestations of this new sense of the relation of the industrial plant to the community is the erection of commodious and substantial office buildings which are a credit to architecture. Whereas a few years ago the notable office building of the large industrial plant was the exception, the next few years promise a large addition of this sort of structure. No longer will Europe remain conspicuous in this regard, with plant office structures commonly of the proportions, design and appointments of the best in governmental buildings.



# Piece Work the Practice at Arsenals

Data Accumulated Under Scientific Management Regime Are of Much Use  
—Men Satisfied with Bonus System

WASHINGTON, D. C., Dec. 23, 1916.—That the legislation prohibiting the use in manufacturing establishments under the War Department of certain specified devices in scientific shop management has not altogether accomplished its purpose and that the arsenals are still able to compensate certain classes of skilled labor on an output basis and in other cases are able to employ data gathered before the prohibition took effect for use in rate setting are made clear in the annual report of Gen. William Crozier, chief of the Bureau of Ordnance. Manufacturers of munitions will be especially interested in figures presented by General Crozier showing the cost of producing certain material made in both Government and private establishments. The heavy increase in the prices of nearly everything entering into the manufacture of small arms, fixed ammunitions, shells and shrapnel and the high scale of wages which the Government has been forced to pay during the past year, not only to meet the requirements of the law fixing wage scales, but to prevent private manufacturers from securing the most competent of the arsenal workmen, are also commented upon.

The Army appropriation act of March 4, 1915, prohibited the making of time studies and the payment of premiums, as far as work done under that act was concerned. This operated to stop time studies, since these were made under the direction of officers who were paid out of the army act appropriations. But as most of the premiums which had been paid in the department had been paid from funds appropriated in the fortifications act, it had little effect upon these. At its last session, however, Congress placed the restrictive legislation not only upon the army appropriation bill, but also upon the other supply bills affecting this department, so that time studies and premium payments are now effectively forbidden.

## RATE SETTING STILL POSSIBLE

That the legislation, in spite of its prohibitions, has not prevented rate-setting, General Crozier frankly asserts. He says:

A time study is a scientific method for determining the best order and sequence in which a given piece of work should be performed, and for ascertaining the time which it ought reasonably to be expected to take; so as to permit the setting of a fair rate to compensation for the job. The reliability of the method depends upon the degree to which the scientific character which it ought to have is attained. The restrictive legislation interferes with the scientific character of the method, by prohibiting the division of a job into component parts for separate timing, but it does not abolish the method altogether, and a less perfect method of rate setting than the time study is therefore still possible.

A premium is a means of payment of a workman for output, with an assured minimum of his regular wage. The employment of this means has been prohibited, but the Comptroller of the Treasury has decided that the piecework method of payment for output, which makes the compensation correspond with the production, but without an assured minimum, is not prohibited, and is therefore still available. Piece work has prevailed to a large extent in the Ordnance Department for many years, and is still pursued. At the Watertown Arsenal, where there is not much repetition work, there has heretofore been little piece work, and the compensation for output has been in the form of premiums, which are now forbidden. With the assistance of such time studies as have been made in the past it will be possible to carry on a good deal of this work under the piece-work system, and this possibility is under study. In the meantime premiums have ceased, to the expressed dissatisfaction of a number of the employees. If a good method of rate setting is available it does not make much difference whether the stimulus to extra earnings is afforded by the piece-work, the premium, the bonus, or any other system of payment; and if such stimulus is to be avoided and payment made altogether irrespective of the output, it must be by the prohibition altogether of payment for output.

## OBJECTORS DID NOT EARN PREMIUMS

Referring to conditions in the Frankford, Pa., Arsenal, General Crozier says the system of shop management which was begun in connection with the manufacture of small arms ammunition and which was subsequently extended to the manufacture of artillery ammunition, has proved entirely satisfactory and has effected savings of approximately \$1,865,000. The premium and bonus systems of compensation at this arsenal were abolished by act of Congress, and General Crozier states that "notwithstanding reports to the contrary every employee engaged in the manufacture of the small arms ammunition or in the assembling of artillery ammunition, who was paid under this system, was perfectly satisfied therewith; the real objectors to the premium system of compensation on the part of the employees of this arsenal were almost entirely those who did not enjoy the benefits thereof." Inasmuch as the operations at the Frankford Arsenal are largely in the nature of repetition it has been found practicable to put a considerable part of the work on a piece-rate basis.

At the Watervliet Arsenal there have been compiled in the planning room card records indicating the times taken to perform all important steps in the work of gun manufacture under various orders covering a period of about five years. Similar records of current work as completed are being entered for ready comparison, to serve as an indication of relative efficiency. There has been installed in this connection a merit record system which provides for recognition of work done in an especially expeditious or economical manner. This serves as the basis for raising a workman's efficiency rating, thus placing him in a position to secure higher pay.

The Watertown Arsenal was operated under the scientific management system for several years, but since the enactment of prohibitory legislation all time studies have been discontinued and no premiums paid from appropriations carried in the army appropriation act. Owing, however, to the large amount of standardized data secured in connection with the system of management, it has been possible to continue rate setting with no considerable difficulty, without the use of time study.

## GREAT ADVANCES IN MATERIAL AND LABOR

Concerning the increase in cost of material and labor, which the Ordnance Bureau has been obliged to meet during the past year, General Crozier says:

The cost of material and labor has increased so extensively, even in the last year, and a continuation of the increase seems so likely, that it is anticipated the procurement of field and seacoast artillery material and many other classes of ordnance supplies in the quantities covered by the estimate submitted at the last session of Congress will not be possible unless additional funds be appropriated at the coming session to complete the work. While the increase varies for different classes, and not in accordance with any fixed rule, it is conservatively estimated that the average increase in cost of ordnance material during the past 12 months is from 25 to 40 per cent.

At the Frankford Arsenal the year was marked by great advances in the wages of employees and a further increase is contemplated at the present time. In this connection General Crozier says:

The most noted increases have been of machinists and toolmakers to the extent of 20 per cent; of instrument makers to the extent of 47 per cent; of automatic screw makers to the extent of 16 per cent; of machine operators to the extent of 20 per cent; and of assistant foremen to the extent of 35 per cent. The cost of materials has been even more marked. Pig antimony advanced 621 per cent; high-speed steel, 573 per cent; optical glass, 416 per cent; trinitrotoluol, 266 per cent; tobin bronze, 200 per cent; cartridge brass, 145 per cent, etc. Marked economies and dispatch in manufacture cannot be obtained under such conditions.

The average appropriation cost of rifle ammunition during the year was \$24.32 per thousand, as compared with \$22.15 per thousand for the preceding year. There was, however, an increase in the cost of material per thousand cartridges of \$3.37, as compared with the cost of the same material for the preceding year. The cost of pistol ball cartridges, caliber .45, was \$14.52 per thousand, as compared with \$11.58 per thousand for the preceding year; much of this increase is due to the increase in cost of material, which amounted to \$2.39 per thousand.

An important chapter of the report deals with the co-operation which the Government hopes to secure from private establishments which have been either enlarged or brought into existence by the European war. Reference is made particularly to the appropriations for special jigs, dies, fixtures, etc., for fitting private establishments for the manufacture of the particular models of arms and ammunition which are employed in the military service. How inadequate these provisions are, General Crozier points out with great force. He says:

These special provisions are all in the right direction, and will materially aid this department in its plans for utilizing private industry for supplying such emergency needs as may arise. Unfortunately, they do not constitute the only kind of legislation found in the supply bills upon the special utilization of private industry, and are to a certain extent offset in their intentions by restrictions upon the employment of appropriations in general for such patronage of private manufacturers as would of itself operate to prepare them for the Government's use, or to keep in existence plants which have already fitted themselves for the manufacture of war material in order to meet the orders of European governments.

Some of the appropriations are accompanied by the provision that they shall not be used for placing orders with private manufacturers at prices exceeding by more than 25 per cent the cost of manufacturing the same material in the Government arsenals, or the estimated cost of such material when it has not been previously manufactured in the arsenals. As the Government has been able, in some cases, to manufacture quite cheaply, this may operate to prevent the placing of orders with private manufacturers. Other appropriations are accompanied by the provision that they shall not be expended in such a manner as to prevent the operation of the arsenals at their most economical capacity. As this capacity is probably that of a two-shift rate, the effect of the legislation is to prevent any of the funds appropriated from being applied to private orders until after the arsenals shall be running at full capacity upon a two-shift basis, and then only to the extent of the excess of the appropriations over the amounts necessary to keep the arsenals going upon this basis.

Many of the appropriations are of such size as to afford some excess for private orders, but the number of private establishments which can be utilized and trained in time of peace will be less than it would be if there could be employed for the purpose the funds in excess of the amounts which will be necessary to operate the arsenals upon a one-shift basis only, at which rate they would themselves also have a larger reserve of expansibility for the needs of war time. There are thus opposing tendencies in the legislation which has been enacted with reference to what has sometimes been spoken of as the mobilization of industry.

Ordnance experts are now engaged in studying the problem as to how the appropriation for equipment to be installed in private establishments shall be distributed, but it is doubtful if a decision will be reached within the next month.

W. L. C.

At Columbus, Ohio, last week, the State Utilities Commission ordered that the East Ohio Gas Company discontinue gas service to all consumers in the Cleveland district, using 100,000 cu. ft. or more of gas per month. This is done to increase the supply for domestic purposes, a previous order by the commission shutting off large consumers having failed to bring relief to Cleveland. The new rule may be made to apply all over the State, regardless of the contracts between gas companies and consumers. A serious shortage exists, especially in Cleveland and Cincinnati.

Spain's steel output in 1915, according to recent statistics published by the Spanish Consejo de Minera, comprised 439,835 tons of pig iron and 387,314 tons of finished iron and steel, against 382,044 of the former and 330,000 tons of the latter in 1914.

THERMO-PHYSICS OF CAST IRON

Factors Having an Important Bearing on the Problem of Shrinkage

The following data from notes taken at the December meeting of the New England Foundrymen's Association, at which Dr. Richard Moldenke gave an address on the "Physics of Cast Iron," will be of interest to foundrymen:

The expenditure of heat during the cupola melting process may be divided into three parts, namely: Heat to bring stock up to point of melting, heat absorbed during melting without rise in temperature, and heat for super-heating the metal. This is summarized as follows:

	B.t.u. Per Lb. of	
	Gray Iron	White Iron
Heat up to melting.....	850	790
Heat during melting.....	120	120
Heat for superheating.....	180	120
Total.....	1,150	1,030

The figures show that at least two-thirds of the total heat expended in the cupola melting process goes into the stock before actual melting takes place. Hence the importance of utilizing all the heat possible from the products of combustion ascending through the stack. High charging doors and allowing the cupola to stand charged as long as possible before blast is put on are a great help to efficient practice.

A further point of interest is the relatively smaller amount of heat required to melt white iron as well as to superheat it for proper pouring temperature. The bearing of this will be seen from the table above given, as follows: The heat necessary to be dissipated through the mold walls to make cast iron set fully is found by deducting the heat units of the metal as just set from the total amount when superheated. In the case of gray iron this is complicated by the fact that the freezing point is lower than the melting point. In white iron this is practically identical. The carbon in all molten cast iron being combined, the freezing (setting) point, whether the iron will set gray or set white, corresponds to the melting point of a white iron with equal combined carbon content. Hence the following data will serve:

Gray iron—1150 B.t.u. minus 790 B.t.u. (at melting point of white iron) equals 360 B.t.u., or a matter of 300 deg. F. drop available before it sets.

White iron—1030 B.t.u. minus 790 B.t.u. equals 240 B.t.u., or 150 deg. F. drop only available before it sets.

Then there is the additional heat given out when graphite separates out as the iron sets gray. This retards the freezing point somewhat. The above figures account for the quicker setting of white iron and the difficulty of holding it in the ladle for any time with safety.

In connection with the ever-present shrinkage problem in cast iron, the figures below will prove illuminating. The specific gravity of cast iron can be given thus:

Gray iron—sp. gr. 7.10, 443 lb. per cu. ft., or 0.256 lb. per cu. in.  
White iron—sp. gr. 7.50, 468 lb. per cu. ft., or 0.271 lb. per cu. in.

This is for averages. For purposes of closer comparison gray iron may be taken at 7.00 and white iron at 7.70 sp. gr., while molten iron runs about 6.65 sp. gr.

If these figures are studied it will be noticed that the solid metal is heavier than the molten; and in another form, an equal weight of solid metal takes less space than the liquid. Actually,

Gray iron, in setting, shrinks in volume about 5.2 per cent.  
White iron, in setting, shrinks in volume about 12.3 per cent.

This shows the seriousness of the shrinkage problem in cast iron. Unless feeding proceeds until the casting can set sound—before the gates and risers freeze up—spongy, porous and weak castings will result. The tremendous effect of this characteristic of cast iron is easily seen in white-iron castings, but does not get the attention it should in gray-iron work. The gating of castings is therefore one of the most important items in the foundry and should not be left to the molder entirely but should receive the foreman's earnest study in addition.



## WEBB BILL IN DANGER?

### Delays in Senate and Threatened Amendments Arouse Its Friends

WASHINGTON, Dec. 26, 1916.—An extraordinary situation has developed in the Senate with respect to the Webb bill, designed to promote export trade by legalizing combinations of American manufacturers and merchants in foreign business, and fear that it may fail of passage in the present Congress is being frankly expressed by its friends in both houses and among Administration officials. Energetic steps are being taken to arouse the Senate in behalf of the bill and to secure the co-operation of the business men of the country in hastening final action, but in view of the very definite opposition that has recently developed the position of the measure is distinctly precarious.

The Webb bill originated in the House and bears the name of the chairman of the Judiciary Committee of that body, who introduced it in the form in which it had been drafted by the Federal Trade Commission and approved by the President and his advisers. The rapid progress made in the House augured well for its early enactment. Introduced on Aug. 8, it was reported one week later and within a fortnight was passed and sent to the Senate. The Senate leaders planned a parliamentary short cut which contemplated adding the measure as an amendment to the omnibus revenue bill; but this idea was abandoned when two or three Senators gave notice that such action would imperil the revenue measure, the early passage of which was greatly desired. The Webb bill was then sent to committee, the Administration leaders of the Senate announcing that it would be reported, taken up and passed immediately upon the reconvening of Congress in December.

### HEARINGS MEAN DELAY

Congress has now completed the preliminary work of the session and adjourned until Jan. 2, but no steps whatever have been taken looking to early action on the export trade bill. A semi-official statement has been made that hearings will be held on the bill in January, but this can hardly be taken as a favorable indication. The House committee massed all the necessary facts and arguments in a clear and convincing report on the measure, and the Federal Trade Commission, during the past month, has made public an elaborate two-volume compilation of the results of its own investigations of European trade combinations. What is to be gained by further hearings before the Senate committee is difficult to imagine. It is perfectly obvious, however, that the object of these hearings is delay and that if two or three weeks can be consumed before the bill is reported it will be entirely practicable for two determined Senators to prevent action during the few remaining days of the present Congress.

A recent development in this interesting situation is the sinister suggestion now for the first time heard that the bill "is crudely drawn and needs amendment." As a matter of fact, the Webb bill has been scrutinized by a larger number of legislative experts than have been consulted as to any other measure pending in this Congress. Its terms are so simple and direct that he that runs may read. It provides that nothing in the anti-trust laws shall be construed to render illegal "an association entered into for the sole purpose of engaging in export trade and actually engaged solely in such trade, or an agreement made or act done in the course of export trade by such association, provided such association, agreement or act is not in restraint of trade within the United States"; that no provision of the Clayton act shall be construed "to forbid the acquisition or ownership by any corporation of the whole or

any part of the stock or other capital of any corporation organized solely for the purpose of engaging in export trade"; that the prohibition against "unfair methods of competition," contained in the act creating the Federal Trade Commission, "shall be construed as extending to unfair methods of competition used in export trade against competitors engaged in export trade, even though the acts constituting such unfair methods are done without the territorial jurisdiction of the United States; and, finally, that every association organized under the proposed law shall within 30 days after its creation file with the Federal Trade Commission a verified written statement setting forth its place of business, the names and addresses of all its officers and stockholders, together with a copy of its certificate of incorporation or articles of association"?

### BUSINESS MEN SHOULD ACT PROMPTLY

In the opinion of the ablest lawyers in Congress the concessions from the anti-trust laws embodied in the Webb bill are fully safeguarded, and it is the general belief that no one in the Senate who really desires the passage of the bill will attempt its amendment. The sole purposes are believed to be, first, to consume time, and, second, to so load down the measure as to bring about its direct defeat or its rejection by the House when returned to that body for concurrence in the Senate modifications.

Business men who are interested in the fate of the Webb bill have at least a week in which to signify their interest to their respective Senators and to bring to the attention of the Senate Committee the great desirability of early action on the measure. The prospect of an early termination of the European war, which appears to be steadily improving, is only another argument in favor of early action on the Webb bill which would serve as a strong bulwark for the protection of exporting organizations called upon to meet the government-aided combinations of Europe already launched for the recovery of trade lost during the great conflict.

W. L. C.

### Iron and Steel Institute Associates

The annual meeting of the Iron and Steel Institute (British) will be held May 3 and 4, 1917, and the autumn meeting Sept. 20 and 21, 1917, in London. The secretary, George C. Lloyd, calls attention to the fact that a new class of associates has been established by the council, election to which will take place by ballot in the usual way at the general meetings. Candidates for the new class must be persons not exceeding 24 years of age and have one or other of the following qualifications:

Students of metallurgy taking courses at a university, university college, or technical school.

Pupils or apprentices to metallurgists or engineers, or in metallurgical or engineering works.

Persons employed in some practical or scientific capacity in metallurgical or engineering works.

Associates over 21 years of age, if qualified for membership, may be transferred by the council to full membership.

The Parkesburg Iron Company, Parkesburg, Pa., has purchased the Spring City Bloom Works, Spring City, Pa., of which the E. P. Leaf Company, Philadelphia, was the principal owner. The Spring City plant consists of eight forge fires, and for a number of years produced a fine quality of charcoal iron blooms. For some time, however, it has been standing idle. The new owner will remodel and overhaul the plant and place it in operation as soon as possible. The blooms will be shipped to Parkesburg where they will be manufactured into charcoal iron tubes. The tube mill of the Parkesburg Iron Company has been falling behind in its orders because its plant at Parkesburg is unable to turn out blooms fast enough.



## Argentine Pipe Commission Arrives

The Technical Commission appointed by the Argentine Republic to supervise the manufacture of the 65,000 tons of cast-iron pipe awarded the United States Cast Iron Pipe & Foundry Company by the Obras Sanitarias de la Nacion in October, arrived in New York Dec. 25, on the steamer Pastores. The commission is composed of the following Argentine engineers connected with the department of the Obras Sanitarias de la Nacion: Alfredo F. Lasso, Bartolome Raffo, Guerino Talevi, Raul Calandra, and Alfredo Marino.

The contract in question is the largest single pipe contract ever placed by this department, as well as the first to be placed by the department with any United States manufacturer, and is one of the largest single cast-iron-pipe orders in the history of the industry. Its award to the American makers has, therefore, aroused great interest and comment. Competition for this business was very keen between the European founders and the United States Company. Upon the formal opening of the bids a cursory examination of the prices indicated that the Allied British Founders were about 2 per cent lower than the United States Company, which apparent advantage was nullified by the fact that the British Founders refused to bid in accordance with the conditions established by the department of the Obras Sanitarias de la Nacion. The United States Cast Iron Pipe & Foundry Company was the only company bidding in strict accordance with the specifications and invitation to tender.

The time and assurance of delivery were essential conditions of the contract, as the material was urgently needed; and the Argentine department had suffered seriously from the failure of foreign manufacturers to deliver on previous contracts. On this account, the government, in its official announcement of the award, made to the press on Oct. 27, stated that "After a detailed examination was made of each of the proposals presented, the directorate of the Obras Sanitarias de la Nacion resolved to accord the supplying of this material to the United States Company due to the fact that its offer was in strict accordance with the conditions specified, and in its final analysis was \$60,000 lower than the minimum price of the British Founders."

Criticism emanating from circles that are controlled by interests closely allied to the competitors of American manufacturers has been directed against the award of this contract. It is to be regretted that more publicity has been given to this criticism in the United States than in the Argentine, where the reputation of the department making the award precludes criticism. Throughout the Argentine Republic, in governmental and responsible business circles, the award to the United States Company has been noted with approval and satisfaction.

It is a matter of congratulation that an American company has been able to secure this contract, assuring as it does the closer business relationship between the Argentine Republic and the United States and a new outlet for "United States-made" cast-iron pipe. The tonnage involved approximates 2500 miles of cast-iron piping, or what is ordinarily considered a sufficient amount of water piping to completely equip a city of at least a million people; and in this one order there are more miles of piping than are used in the entire water systems of either St. Louis, Baltimore, or Minneapolis. In Philadelphia, in the entire water-distribution system, which has been building since 1798, there are only about 3300 miles of piping. This is eloquent testimony of the growth of the Argentine Republic and its disposition to carry on public works on a large scale. The value of the contract is approximately \$3,500,000 U. S. gold, and it will require at least 4500 standard freight cars to move the material from the works to port of shipment, and approximately 20 vessels to carry the material to the Argentine Republic.

Western customers received notice last week from manufacturers of abrasives and grinding wheels at Niagara Falls, N. Y., that Canadian embargoes on Niagara electric power have made it necessary to cease production.

## CONTENTS

The Engineering Department Modernized.....	1439
A Tilting Wood Band Sawing Machine.....	1444
Press for Forming Truck Side Rails.....	1445
Electric Furnaces as Absorbers of Idle Electric Units.....	1445
Indexing Head for Fine Graduations.....	1445
Rail Re-rolling Mill at Marion, Ohio.....	1446
Constant-Current Arc Welding System.....	1448
Semi-Automatic Thread Milling Machine.....	1449
Radial Drilling Machine with 3½-Ft. Arm.....	1449
One-Man Detachable-Tongue Shop Truck.....	1450
Automatic Machine for Grinding Hobs.....	1450
Four-Spindle Motor Boring Machine.....	1451
Hot Bed Practice in Rail Mills.....	1451
Collapseable Tap for Turret Machines.....	1452
The Failure of Brass.....	1452
Germany's Supplies of Ferromanganese.....	1453
U. S. Electro Galvanizing Company Expanding.....	1455
Editorials:	
Time to Act for the Webb Bill.....	1456
Industrial Census of 1916 Needed.....	1456
Rolling Stock Scarcely Obtainable.....	1456
Compelling Workers to Earn More Money.....	1457
Branch Plants in Canada.....	1457
The Plant Improvements to Come.....	1457
Plant Office Buildings Get Attention.....	1457
Piece Work the Practice at Arsenals.....	1458
Thermo-Physics of Cast Iron.....	1459
Webb Bill in Danger?.....	1460
Iron and Steel Institute Associates.....	1460
Argentine Pipe Commission Arrives.....	1461
Iron and Steel Markets.....	1462
Iron and Industrial Stocks.....	1472
Customs Decisions.....	1472
Norway's Steel Exports and Imports in 1916.....	1472
Spain's Imports and Exports of Steel.....	1472
Finished Iron and Steel Prices, Pittsburgh.....	1473
Metal Markets.....	1474
Height Gage with a Vernier Attachment.....	1474
A Large Pinion of Noiseless Type.....	1474
Large Orders for Locomotives.....	1475
Coating Basic Furnace Linings with Enriched Slags.....	1475
Investigation of Clay Refractories.....	1475
Harris Engineering Company's Operations.....	1475
New Heroult Furnace.....	1475
Rennerfelt Electric Furnaces.....	1475
Increasing the French Steel Output.....	1475
Personal.....	1476
Obituary.....	1476
Brass Manufacturers' Annual Meeting.....	1477
Registration of All British Firms.....	1477
Tribute to C. M. Schwab.....	1477
Australia Prohibits Tin-Plate Imports.....	1477
Wage Advances and Bonuses.....	1478
Contracts for Ford Blast-Furnace Plant.....	1479
Chain-Selling Arrangements Changed.....	1479
Interstate Iron & Steel Company Acquires Grand Crossing Tack Company.....	1479
Wagner Electric Mfg. Company Changes.....	1479
Machinery Markets and News of the Works.....	1480
Judicial Decisions.....	1488

One of the Hubbard blast furnaces of the Youngstown Sheet & Tube Company has been banked for lack of coke and some other stacks in the Youngstown district and possibly in the Shenango Valley will bank before the week is out unless the supply improves. The sheet mills of the Youngstown Sheet & Tube Company are also down, but the tube mills, which have been off more than a week, started up on Wednesday, Dec. 27.

# Iron and Steel Markets

## TRANSPORTATION TROUBLE

### Many More Blast Furnaces Banked

**New Railroad, Shell Steel and Structural Demand  
—Holding Off on Forward Delivery Steel**

Transportation troubles are the most obtruding factor in the steel market, just at a time when the trade is making every effort to appraise the effects of peace talk. Many blast furnaces have been banked in the past week for lack of coke, the Steel Corporation alone counting 19 on this list. The railroad rule, when in doubt declare an embargo, is being enforced right and left. Southern iron is being refused by Ohio railroads. Pig iron and steel for New York harbor points are refused by Central Western lines and in the Pittsburgh and Valley districts iron and steel works are suffering from their worst tie-up.

December from the standpoint of production and shipments and hence of earnings will fall considerably short of November with all the producers of steel. Unfilled tonnage statements will show an increase but it will not be a favorable one.

The fuel scarcity is more serious in all lines. Blast furnaces having by-product coke ovens have no advantage, since they are short of coal. A number of sheet and other rolling mills have been shut down by lack of coal for reheating furnaces.

With so many steel producers behind on their deliveries and loaded with orders that represent from four to eight months of operation, the possibilities of later price readjustments are not a matter of present concern. At the same time, the 5 per cent advance announced in the past week by bolt and nut makers and that of \$2 a ton by a leading producer of bars, plates and shapes do not mean what such advances mean when buying is active.

The effect of peace discussions is chiefly seen in the holding off of buyers who have figured on extended deliveries. This applies to both pig iron and steel. In Ohio, a new steel company inquiring for 37,000 tons of basic iron, with first delivery in May, has put off buying. The late scramble for pig iron for the second half of 1917 was so far a speculation against a scarcity due to Europe's continued heavy buying, that the chance of Europe's demand falling off is bound to have its effect.

Railroad, shell steel and structural demand have figured in the curtailed operations of a holiday market. At Chicago 25,000 tons of rails, 15,000 tons of rail fastenings and 150,000 kegs of bolts and spikes were bought. The Wheeling & Lake Erie

has closed for 5000 tons of rails, and an inquiry has come up for 5000 to 6000 tons of light rails for France. The Pennsylvania Railroad orders for 205,000 tons for 1918 are delayed by the usual contest over prices, in view of new departures in specifications.

The Baldwin inquiry for 30,000 tons of 6 $\frac{3}{8}$ -in. shell stock is the principal item in war steel. On foreign account the buying of 20,000 tons is reported and Italy's inquiry for 40,000 tons is still active.

In structural lines the pending award of 15,000 tons for Newport News shipyard extensions and the closing of 7000 tons for the New York Shipbuilding Company's improvement are of chief interest. For Brooklyn subway work 15,600 tons will come up for bids in the middle of January. The supply of structural work holds up well and industrial extensions continue to figure prominently.

It is expected that the 500 miles of 8-in. pipe for the Sinclair Oil & Refining Company's oil line through Oklahoma and Texas to the Gulf will be divided among several producers in order to get rapid deliveries and it will be several months before the mills can give it space.

All pig-iron markets are distinctly quieter. At Pittsburgh a 10,000-ton sale of Bessemer iron is presumed to have been made below the \$35 Valley basis, and some resale basic iron is reported to have been offered at close to \$29. In the Eastern market about 15,000 tons of basic iron has been sold to two steel companies at \$30 at furnace.

Export pig-iron inquiry keeps up, but the difficulty of getting hold of iron is just as great. In New York sellers are figuring on 15,000 tons of foundry iron for neutral European countries on the west coast. Italy is still asking for Bessemer and low-phosphorus irons.

## Pittsburgh

PITTSBURGH, PA., Dec. 26, 1916.

The opinion is gaining strength that top prices have been reached in the iron and steel market. The only advances in prices the past week were \$2 per ton on plates, shapes and bars by the Carnegie Steel Company, and 5 per cent on nuts and bolts. These are unimportant because the Carnegie Company is practically sold up on the products named for all of 1917, and the nut and bolt makers are filled for the first quarter or longer. The transportation situation grows worse, embargoes being in force on all the New York Central Lines west of Youngstown and on the Erie to many important points, while cars for export shipments are furnished now only under special permits. All of the blast furnaces, rolling mills and steel works are running short-handed because they cannot get in raw materials, and their shipments are held up to a very great extent by the shortage in cars and motive power. However, after the holidays a better car situation may develop. Prices are maintained on pig iron, semi-finished steel and finished material, but if

## A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 27, 1916.	Dec. 20, 1916.	Nov. 29, 1916.	Dec. 29, 1915.
No. 2 X, Philadelphia...	\$29.50	\$29.50	\$27.50	\$19.50
No. 2, Valley furnace...	31.00	31.00	30.00	18.50
No. 2 Southern, Cin'ti...	25.90	25.90	24.40	17.40
No. 2, Birmingham, Ala.	23.00	23.00	21.50	14.50
No. 2, furnace Chicago*	30.00	30.00	27.00	18.50
Basic, del'd, eastern Pa.	30.00	30.00	27.00	18.50
Basic, Valley furnace...	30.00	30.00	30.00	18.00
Bessemer, Pittsburgh...	35.95	35.95	34.45	20.45
Malleable Bess., Chgo*	30.00	30.00	27.00	18.50
Gray forge, Pittsburgh...	29.95	29.95	29.95	18.20
L. S. charcoal, Chicago...	31.75	31.75	28.00	19.25

Rails, Billets, etc., Per Gross Ton:	Dec. 27, 1916.	Dec. 20, 1916.	Nov. 29, 1916.	Dec. 29, 1915.
Bess. rails, heavy, at mill	38.00	38.00	38.00	28.00
O.-h. rails, heavy, at mill	40.00	40.00	40.00	30.00
Bess. billets, Pittsburgh...	60.00	60.00	55.00	32.00
O.-h. billets, Pittsburgh...	60.00	60.00	55.00	33.00
O.-h. sheet bars, P'gh...	60.00	60.00	55.00	35.00
Forging billets, base, P'gh	80.00	80.00	80.00	55.00
O.-h. billets, Phila. ....	60.00	60.00	55.00	40.00
Wire rods, Pittsburgh...	70.00	70.00	65.00	40.00

### Finished Iron and Steel,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Iron bars, Philadelphia...	3.159	3.159	2.659	2.059
Iron bars, Pittsburgh...	3.25	3.25	2.90	1.80
Iron bars, Chicago .....	3.00	3.00	2.65	1.75
Steel bars, Pittsburgh...	3.00	3.00	3.00	2.00
Steel bars, New York...	3.169	3.169	3.169	2.169
Tank plates, Pittsburgh...	4.25	4.25	4.25	2.25
Tank plates, New York...	4.419	4.419	4.419	2.419
Beams, etc., Pittsburgh...	3.25	3.25	3.00	1.90
Beams, etc., New York...	3.419	3.419	3.019	2.069
Skelp, grooved steel, P'gh	2.85	2.85	2.85	1.70
Skelp, sheared steel, P'gh	3.00	3.00	3.00	1.80
Steel hoops, Pittsburgh...	3.25	3.25	3.25	2.00

\*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Dec. 27, 1916.	Dec. 20, 1916.	Nov. 29, 1916.	Dec. 29, 1915.
Sheets, black, No. 28, P'gh	4.50	4.50	4.00	2.50
Sheets, galv., No. 28, P'gh	6.25	6.25	5.50	4.75
Wire nails, Pittsburgh...	3.00	3.00	3.00	2.10
Cut nails, Pittsburgh...	2.95	2.95	2.95	1.90
Fence wire, base, P'gh...	2.95	2.95	2.95	1.95
Barb wire, galv., P'gh...	3.85	3.85	3.85	2.95

### Old Material, Per Gross Ton:

Iron rails, Chicago.....	\$27.00	\$29.00	\$26.00	\$16.00
Iron rails, Philadelphia..	28.00	27.00	24.00	19.50
Carwheels, Chicago .....	20.00	21.50	20.00	14.75
Carwheels, Philadelphia..	22.00	22.50	21.50	16.00
Heavy steel scrap, P'gh...	24.00	27.00	25.00	17.50
Heavy steel scrap, Phila...	23.00	24.00	23.00	16.00
Heavy steel scrap, Chgo...	21.50	23.50	23.00	16.00
No. 1 cast, Pittsburgh...	21.00	23.00	19.50	15.25
No. 1 cast, Philadelphia...	21.00	21.00	20.00	16.75
No. 1 cast, Chgo (net ton)	15.50	16.50	16.00	13.75
No. 1 RR. wrot, Phila...	27.00	27.00	25.00	21.00
No. 1 RR. wrot, Chgo (net)	23.50	25.00	23.00	16.00

### Coke, Connellsville, Per Net Ton at Oven:

Furnace coke, prompt...	\$9.50	\$9.00	\$7.00	\$3.00
Furnace coke, future....	4.50	4.00	4.00	2.40
Foundry coke, prompt...	10.00	9.00	7.50	3.25
Foundry coke, future....	6.00	6.00	5.00	3.00

### Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York...	31.00	32.50	34.00	22.25
Electrolytic copper, N. Y.	31.00	32.50	34.00	22.25
Spelter, St. Louis .....	9.50	10.00	13.00	17.25
Spelter, New York .....	9.75	10.25	13.25	17.50
Lead, St. Louis .....	7.30	7.40	7.17 1/2	5.32 1/2
Lead, New York .....	7.50	7.50	7.25	5.40
Tin, New York .....	40.87 1/2	42.37 1/2	45.25	39.25
Antimony (Asiatic), N.Y.	14.00	14.25	14.50	39.50
Tin plate, 100-lb. box, P'gh	\$7.00	\$7.00	\$6.00	\$3.60

active peace negotiations start, a readjustment of the whole market to a lower basis is to be expected.

**Pig Iron.**—The only local purchases of moment the past week were close to 10,000 tons of Bessemer iron and some low phosphorus by the Mesta Machine Company for delivery in the second half of 1917 at about current prices, or slightly under. Not enough pig iron has moved from sellers to consumers in the past two weeks to test prices. Some resale basic iron has appeared on the market, and it is said 1500 tons of this has been offered at \$29, Valley, or lower. In the absence of definite sales we repeat prices given in last week's report, but on firm offers they could probably be shaded: Standard Bessemer iron, \$35; basic, \$30 to \$31; gray forge, \$29; malleable Bessemer, \$30, and No. 2 foundry, \$31 to \$32, all at Valley furnace, the freight rate for delivery in the Pittsburgh or Cleveland district being 95c. per ton.

**Billets and Sheet Bars.**—Soft Bessemer and open-hearth billets and sheet bars are still held at \$60 to \$65 at maker's mill, with practically no steel being offered. Export inquiry is dull and, in fact, has practically stopped. We continue to quote base sizes and base carbons of Bessemer and open-hearth billets and sheet bars at \$60 to \$65, maker's mill, Pittsburgh or Youngstown, and forging billets \$80 to \$85, for sizes up to but not including 10 x 10 in. and for carbons up to 0.25.

**Ferroalloys.**—Most consumers of ferromanganese are covered for the first quarter and first half at prices ranging from \$160 to \$165, delivered. Domestic 80 per cent ferromanganese is strong at \$165 to \$170 at furnace. English 80 per cent remains at \$164, seaboard, which is the official price, but this could be shaded. A large interest is in the market for 1500 tons of ferromanganese for first quarter. We quote 18 to 22 per cent spiegeleisen at \$50 to \$55 and 25 to 30 per cent at \$65 to \$75, delivered. We quote 50 per cent ferrosilicon for delivery next year, in lots up to 100 tons, at \$100; 100 tons to 600 tons, \$99, and over 600 tons, \$98, all per gross ton, f.o.b. Pittsburgh. We now quote 9 per cent ferrosilicon at \$39 to \$41; 10 per cent, \$40

to \$42; 11 per cent, \$41 to \$43; 12 per cent, \$42 to \$44; 13 per cent, \$43.50 to \$45.50; 14 per cent, \$45.50 to \$47.50; 15 per cent, \$47.50 to \$49.50, and 16 per cent, \$50 to \$52. We quote 7 per cent silvery at \$29.50 to \$30; 8 per cent, \$30 to \$31; 9 per cent, \$30.50; 10 per cent, \$31; 11 per cent, \$32, and 12 per cent, \$33. These prices are f.o.b. at furnace, Jackson or New Straitsville, Ohio, and Ashland, Ky., all of which have a freight rate of \$2 per gross ton to the Pittsburgh district.

**Steel Rails.**—A disagreement is reported between the rail mills and the Pennsylvania Railroad over the price to be charged on its inquiry for 205,000 tons of open-hearth rails, and it is said that the order may be held up for some time. The new demand for light rails from the coal-mining interests is very active, but from lumber and traction concerns is light. The recent heavy advances in prices of old steel rails have caused makers of rerolled light rails to advance their prices, and they are now quoting close to prices for new light rails. We quote new light rails as follows: 25 to 45 lb. sections, \$50; 16 and 20 lb., \$51; 12 and 14 lb., \$52; 8 and 10 lb., \$53, in carload lots, f.o.b. mill, with usual extras for less than carloads. We quote standard section rails of Bessemer stock at \$38, and open-hearth, \$40, per gross ton, Pittsburgh.

**Plates.**—Effective Thursday, Dec. 21, the Carnegie Steel Company advanced its prices on sheared plates \$2 per ton, or to the basis of 3.60c., Pittsburgh, for 1/4-in. and heavier. This, however, has no market bearing, as the company is sold up on sheared plates for all of 1917, and has taken some fairly large orders for ship plates for delivery in the first half of 1918. Other large plate mills that can deliver in the latter part of the first quarter and in the second quarter are quoting from 4c. to 5c. at mill, prices depending entirely on the quantity and delivery. One leading plate mill has sold recently several large lots of sheared plates for shipment in the second quarter at 4.50c. at mill. There is a heavy inquiry for small lots of cars ranging from 25 up, but large inquiry is not active. The Pressed Steel Car Company has taken 600 more general service steel gondolas for the San Pedro, Los Angeles



& Salt Lake Railroad, having previously received an order for 1000. Active inquiries in the market include 1000 composite gondolas for the Baltimore & Ohio, 200 steel hoppers for the Atlantic Coast Line, 100 steel gondolas and 100 box cars for the Long Island and 1000 steel hoppers for the Virginian. Small orders lately placed include 20 flat cars for the Birmingham & Southern with the Pressed Steel Car Company, 80 dump cars for the Oliver Iron Mining Company and 50 steel hoppers for the Virginian with the Standard Steel Car Company. It is said several large active inquiries for cars have lately been withdrawn on account of the high prices quoted and unsatisfactory deliveries promised. We quote  $\frac{1}{4}$ -in. and heavier sheared steel plates at 3.60c., with no promise of delivery and from 4c. to 5c. at mill, depending on quantities and deliveries wanted.

**Sheets.**—The American Sheet & Tin Plate Company has established its price on blue annealed sheets, Nos. 3 to 16 inclusive, at 4c. per lb., and other mills are asking higher prices. The tardy deliveries on steel and scarcity of labor at some mills are holding down the output of sheets to some extent, and with the heavy present demand this is severely felt. Most large sheet mills have no material to offer for first quarter delivery, and some have made fairly large sales for second quarter. Prices on all grades of sheets continue to show a wide range, and the market is difficult to quote accurately. It is reported that No. 28 Bessemer black sheets have sold at close to 6c. for prompt delivery and galvanized at 7c. or above. Although prices are very strong, the belief is growing that the top has about been reached. We quote blue annealed sheets, Nos. 3 to 8, at 4c. to 4.25c.; box annealed, one pass, Bessemer cold-rolled sheets, No. 28, 4.50c. to 5c.; No. 28 galvanized, 6.25c. to 7c.; No. 28 tin-mill black plate, 4.25c. to 4.50c., all f.o.b. mill, Pittsburgh. These prices are for carloads or larger lots, and the higher prices quoted are for reasonably prompt shipment.

**Tin Plate.**—The American Sheet & Tin Plate Company has advanced its official price from \$6.50 to \$7 per base box, but it has no tin plate to sell for delivery in the first half of next year. On current orders from stock tin plate is selling at \$7.50 to \$8 per box and higher. It is evident that, if present conditions last, there will not be enough tin plate this year to meet the demand, and prices may be higher. Much tin plate has been sold for delivery in the second half of 1917, the price to be that fixed later for the second half period. We quote the market for delivery in the first half of next year at \$7 to \$8 per base box, f.o.b. mill. We quote I. C.terne plate, 107 lb., at \$7.15 to \$7.65, and 200 lb. carrying 8-lb. coating at \$11, the usual advances applying for heavier weights and coatings.

**Shafting.**—Most consumers are covered for the first quarter and some through the first half of 1917, the larger of these contracts having been taken at 20 per cent off list and the smaller at 15 per cent. Several makers state they are in position to ship on new orders in from six to eight weeks. Prices are very firm and the 20 per cent discount is obtainable only on the most desirable contracts. We quote cold-rolled shafting at 20 to 15 per cent off in carload lots and 10 per cent off in less than carload lots for first quarter and first half of 1917, f.o.b. Pittsburgh, freight added to point of delivery.

**Railroad Spikes and Track Bolts.**—Several makers state they have taken a few good orders for spikes at the new price of \$3.40 base, but most railroads are covered for the first half, and as yet makers are not willing to sell for second half delivery. Specifications are active and the market is very strong. The new demand for track bolts is heavy, but shipments are held up very much on account of the car and motive power shortage. Railroad spikes in the Chicago district are held at \$3.50 base. We quote track bolts with square nuts at 4.85c. to 5c. to railroads and 5c. to 5.25c. in small lots to jobbers, base. Track bolts with hexagon nuts take the usual advance of 10c. to 15c. We quote railroad spikes as follows: 9/16 in. and larger, \$3.40,

base; 7/16 and  $\frac{1}{2}$  in., \$3.50, base; 5/16 and  $\frac{3}{8}$  in., \$3.75 base; boat spikes, \$3.65, base, all per 100 lb., f.o.b. Pittsburgh.

**Wire Products.**—Several makers state they have been able to get \$3.15 to \$3.25 for wire nails for fairly prompt shipment and proportionate advances on wire. New orders and specifications on wire and wire nails are showing the usual falling off incident to the holiday season. The car situation is worse and some wire mills in this district may shut down before the end of this week on account of shortage in cars and motive power. Shipments are now being badly held up. Prices have not changed, but may be advanced before Jan. 1. We quote as follows: Wire nails, \$3, base, per keg; galvanized, 1 in. and longer, including large head barbed roofing nails, taking an advance over this price of \$2, and shorter than 1 in., \$2.50. Bright basic wire is \$3.05 per 100 lb.; annealed fence wire, Nos. 6 to 9, \$2.95; galvanized wire, \$3.65; galvanized barb wire and fence staples, \$3.85; painted barbed wire, \$3.15; polished fence staples, \$3.15; cement-coated nails, \$2.90, base, these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to the point of delivery, terms 60 days net, less 2 per cent off for cash in 10 days. Discounts on woven wire fencing are 53 per cent off list for carload lots, 52 per cent for 1000-rod lots, and 51 per cent for small lots, f.o.b. Pittsburgh.

**Wire Rods.**—Further quite large sales of both soft Bessemer and open-hearth rods are reported at prices ranging from \$70 to \$75 at mill, while upward of \$80 has been paid for rods for export to Canada. The new demand is still heavy and rods for anything like prompt shipment are almost impossible to obtain.

**Iron and Steel Bars.**—Effective from Thursday, Dec. 21, the Carnegie Steel Company advanced its prices on steel bars \$2 per ton, or to 3c. at mill, but it is practically sold up on all the steel bars it can turn out during all of 1917. Other makers that can ship out in first and second quarters are quoting from 3.10c. to 3.25c. at mill. No large inquiries for steel rounds have come into this market lately. The new demand for reinforcing steel bars and refined iron bars is heavy and prices are strong. Some contracts for steel bars have been placed by implement makers lately for delivery in the first half of 1917 at 2.90c. to 3c. at mill. We quote steel bars at 3c. to 3.25c., depending on quantity and deliveries wanted. We quote refined iron bars at 3.25c. and railroad test bars at 3.40c. in carload lots, f.o.b. Pittsburgh.

**Nuts and Bolts.**—Late last week makers again advanced prices of nuts and bolts about 5 per cent. The demand is reported heavy and deliveries are bad on account of the car and motive power shortage. New discounts now in effect are as follows:

Carriage bolts, small, rolled thread, 40 and 10 per cent; small, cut thread, 40 and 2½ per cent; large 30 and 5 per cent.

Machine bolts, h. p. nuts, small, rolled thread, 50 per cent; small, cut thread, 40 and 10 per cent; large, 35 and 5 per cent.

Machine bolts, c. p. c. and t. nuts, small, 40 per cent; large, 30 per cent. Bolt ends, h. p. nuts 35 and 5 per cent; with c. p. nuts, 30 per cent. Lag screws (cone or gimlet point), 50 per cent.

Nuts, h. p. sq. and hex., blank, \$2.50 off list, and tapped, \$2.30 off; nuts, c. p. c. and t. sq., blank, \$2.10 off, and tapped, \$1.90 off; hex., blank, \$2.50 off, and tapped, \$2.30 off. Semi-finished hex. nuts, 50, 10 and 5 per cent. Finished and case-hardened nuts, 50, 10 and 5 per cent.

Rivets, 7/16 in. in diameter and smaller, 45 and 10 per cent.

**Rivets.**—Nearly all consumers are covered for the first quarter and some through the first half at prices considerably lower than are ruling now. Makers report the new demand active and specifications coming in quite freely. Makers' prices are as follows: Buttonhead structural rivets,  $\frac{1}{2}$  in. in diameter and larger, \$4.25 per 100 lb., base, and conehead boiler rivets, same sizes, \$4.35 per 100 lb., base, f.o.b. Pittsburgh. Terms are 30 days net or one-half of 1 per cent for cash in 10 days.

**Cold Rolled Strip Steel.**—Most consumers are covered for the first quarter and a few through the first

half and the new demand has quieted down. Prices are firm and makers are being importuned by consumers to open their books for second half, but have not yet done so. On current orders for reasonably prompt shipment, makers quote \$7 for fair-sized quantities up to \$7.50 per 100 lb. for small lots. Terms are 30 days net, less 2 per cent off for cash in 10 days, delivered in quantities of 300 lb. or more when specified for at one time.

**Structural Material.**—New inquiry is active. The American Bridge Company has taken 1850 tons of bridge work for a Western railroad, 260 tons for a pier shed for the Baltimore & Ohio Railroad, and three towboats of 1000 hp. each and 70 steel barges of the standard type, 1000 tons capacity each, for the Carnegie Steel Company. The Baltimore & Ohio also placed 700 tons of bridge work with the Fort Pitt Bridge Works and the Toledo Bridge & Iron Company. The Fort Pitt Bridge Works has also taken 1800 tons for a viaduct for the New York Central. The McClintic-Marshall Company has the order for 7000 tons of steel for extensions to the plant of the New York Shipbuilding Company, Camden, N. J. Effective Thursday, Dec. 21, the Carnegie Steel Company advanced its price on beams and channels up to 15 in. to 3.10c., Pittsburgh. We now quote beams and channels up to 15 in. at 3.50c. to 4c., depending on the size of the order.

**Hoops and Bands.**—Effective Thursday, Dec. 21, the Carnegie Steel Company advanced steel hoops \$2 per ton to \$3.35 and steel bands to \$3.10, with extras as per the steel-bar card. These prices, however, are merely nominal, as the company is sold up on hoops and bands for the first half of 1917 and could not make any deliveries before the third quarter. Other mills that can ship more promptly are quoting 3.25c. to 3.35c. on steel bands and from 3.50c. to 3.75c. on steel hoops, depending on the quantity and delivery wanted.

**Wrought Pipe.**—The mills are now figuring on an active inquiry for 500 miles of 8-in. pipe for the Sinclair Oil & Refining Company to be shipped to Texas and Oklahoma for laying an oil line to the Gulf. The order will likely be divided among several mills, as no one mill is in position to make the deliveries wanted. Other large inquiries are in the market for pipe for gas and oil lines, but the mills are filled so far ahead they are not in position to quote for delivery on these before next summer. On lap-welded pipe the mills are sold up for six months or longer, but on butt-weld sizes can ship in six or eight weeks. One leading maker of pipe, with orders already taken, in connection with business that will come regularly from its customers, has practically its entire output of pipe sold for all of next year. Prices are very firm and on line pipe are more than double what they were this time last year. Discounts are given on another page.

**Boiler Tubes.**—Reports are out that an advance in prices will be made on both locomotive and merchant tubes on or before Jan. 1. Prices really cut very little figure, as the mills are sold up for nearly a year ahead, but any maker that can ship fairly promptly can get heavy premiums over regular prices. Discounts are given on another page.

**Coke.**—The car situation is steadily getting worse. On Saturday, Dec. 23, the Carnegie Steel Company banked three of its Ohio blast furnaces at Youngstown for lack of coke. Other stacks have had to bank for a day or two until coke arrived. Unless conditions improve, the end of this week will see more blast furnaces in this section banked. Furnaces in distress have paid up to \$10 per ton for coke and were glad to get it at that price. None of the producers talks less than \$5 per ton on contracts for coke for first half, their position being strengthened by the recent advance of 10 per cent in labor. We now quote best grades of furnace coke for spot shipment at \$9.50 to \$10 and on contracts, \$4.50 to \$5 per net ton at oven. Prices on foundry coke are also higher, spot shipments being held at \$10 and more and contracts for best grades at \$6 to \$7 per net ton at oven. The Connellsville *Courier* gives the output of coke in the Upper and Lower Connellsville region for the week ended Dec. 23 as 375,501 net tons, a decrease over the previous week of 49,264

tons. This is the heaviest decrease in output in any one week.

**Old Material.**—The peace overtures from Germany are given as the cause of a severe decline in prices of scrap the past week. Some grades are off \$2 per ton or more. The shortage in cars and the railroad embargoes are seriously handicapping shipments. As soon as the decline in prices started, about the middle of last week, new buying stopped and there have been no sales of note. Our quotations are nominal as no material is moving. Prices for delivery in Pittsburgh and other consuming points that take Pittsburgh freight rates, per gross ton, are nominally as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh, delivered .....	\$24.00 to \$25.00
No. 1 foundry cast .....	21.00 to 22.00
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa. ....	28.00 to 29.00
Hydraulic compressed sheet scrap ..	21.00 to 22.00
Bundled sheet scrap, sides and ends, f.o.b. consumers' mills, Pittsburgh district .....	16.50 to 17.00
Bundled sheet stamping scrap .....	15.00 to 15.50
No. 1 railroad malleable stock .....	20.00 to 21.00
Railroad grate bars .....	11.00 to 12.00
Low phosphorus melting stock .....	33.00 to 34.00
Iron car axles .....	46.00 to 48.00
Steel car axles .....	45.00 to 46.00
Locomotive axles, steel .....	48.00 to 49.00
No. 1 busheling scrap .....	18.00 to 18.50
Machine-shop turnings .....	12.00 to 12.50
Old carwheels .....	22.00 to 22.50
Cast-iron borings .....	13.00 to 13.50
*Sheet bar crop ends .....	28.00 to 29.00
No. 1 railroad wrought scrap .....	21.00 to 21.50
Heavy steel axle turnings .....	16.00 to 17.00
Heavy breakable cast scrap .....	18.00 to 18.50

\*Shipping point.

## Philadelphia

PHILADELPHIA, PA., Dec. 26, 1916.

Specifications for steel products show not the slightest tendency to slow up, but new business is a little lighter. The recent peace talk, stock market happenings and the holiday combined to slow things up a bit in some directions, but not in all. Orders continued to roll into the plate mills which can supply fireboxes, flanged plates, boilers and other material required for the great number of locomotives which are being placed, while the carbuilders are another prolific source of demand. The Baldwin Locomotive Works are inquiring for 30,000 tons of shell steel. One steel mill quotes 3.159c., Philadelphia, for steel bars, 3.409c. for structural shapes, and 4.159c. for plates, though it is not much of a factor in the last named. This mill is selling to its regular customers for the second quarter, but prorating shipments and not giving large consumers all they want. Billets are stronger. The foundry iron market has been quiet, but prices remain firm. A steel mill has purchased from 8000 to 12,000 tons of basic at \$30 furnace. The coke troubles of the furnaces are unrelieved, and prices are tending toward higher levels. The old material market is almost at a standstill. Consumers have refused to consider heavy melting steel at \$24. Rerolling rails and iron rails are stronger, but carwheels and wrought-iron pipe are lower. Great Britain has placed a ban on shipping news concerning ships leaving or arriving at her shores, which will place importers of ferromanganese more than ever in the dark concerning their supplies from abroad.

**Pig Iron.**—The only noteworthy transactions of the week were in basic. An eastern Pennsylvania plate mill has taken several thousand tons, at least 8000 and possibly 12,000 tons. Whether it has concluded buying is not stated. Orders were placed with at least three furnaces, it is understood, at \$30, furnace. The mill in question is actuated by a desire to protect itself against a shortage of iron which might be brought about by a failure of deliveries on existing contracts. Another buyer took between 2000 tons and 3000 tons of basic at \$30, furnace. Keeping their furnaces in operation in the face of a short supply of coke is the chief concern of pig-iron producers, while, on the other hand, the shortage of cars, with the time consumed in making deliveries, is another source of trouble. But little buy-



ing of foundry iron has taken place, but prices are firm, and in some cases even stronger. One maker advanced his quotation from \$30 to \$32, furnace, then withdrew from the market altogether. Another brand is held at \$30, furnace, or \$30.84, Philadelphia, and another at \$31, furnace, or \$32.90, Philadelphia. A moderate amount of resale iron is still available. For Virginia iron running 4 to 5 per cent silicon \$29.25, furnace, or \$32, Philadelphia, is quoted, and for 2½ to 3 per cent silicon (No. 2 X) \$28.50, furnace, or \$31.25, Philadelphia, is asked by one maker. These prices are for delivery over the first half, but none can be shipped before the middle of January. Standard low phosphorus is unchanged at \$52 to \$55, delivered, the minimum price commanding comparatively high phosphorus. For export over \$55, seaboard, has been paid. No sales of Bessemer are reported. Quotations for standard brands delivered in buyers' yards, prompt shipment, range about as follows:

Eastern Pa. No. 2 X foundry.....	\$29.50 to \$30.50
Eastern Pa. No. 2 plain.....	29.00 to 30.00
Virginia No. 2 X foundry.....	29.50 to 30.50
Virginia No. 2 plain.....	29.25 to 30.25
Gray forge .....	28.25 to 28.75
Basic .....	30.00
Standard low phosphorus .....	52.00 to 55.00

**Iron Ore.**—No arrivals of foreign ore at this port are reported for the week ended Dec. 23. There is a good bit of inquiry for manganese ore, but scarcity of ocean bottoms continues a detriment to business.

**Ferroalloys.**—No changes in price are reported. Domestic 80 per cent ferromanganese is strong at \$175, delivered, for any delivery, with foreign at \$164, but with no prompt available. The trade will be more than ever in the dark as to prospective arrivals now that Great Britain has placed a ban on shipping reports. The departure of vessels for the United States, or their arrival in British ports, will not be announced in the future, according to information recently received. Already, prior to the notice, the first that consignees knew of some shipments was when they arrived in Philadelphia or Baltimore. The nominal quotation for 50 per cent ferrosilicon is \$100, Pittsburgh, for carloads, and \$99 for 100 tons or more, but prices are really a matter of private negotiation. Arrivals of English ferromanganese at this port last week totaled 1106 tons. In January one consignee will receive 2000 to 3000 tons.

**Plates.**—The heavy placing of orders for cars and locomotives is piling up a large amount of work for the plate mills, especially those which have the equipment for flanging, bending, etc. One mill in this class, whose prices are 4.159c., Philadelphia, for universal plates, 5.159c. for tank plates, and 6.159c. for ship steel, is again contemplating a further advance; yet 4.159c., Philadelphia, can be done. Its deliveries are stiffening more than ever, and it is being pressed by Pittsburgh consumers who want plates. Two other makers quote 4.909c., Philadelphia, for tank plates. Neither is seeking business for ship steel, the demand for which seems without end.

**Bars.**—The Baldwin Locomotive Works have issued an inquiry for 30,000 tons of 6½-in. shell stock, delivery to be at the rate of 5000 tons a month. Ordinary steel bars are quoted at 3.159c. to 3.659c., Philadelphia, with 3.409c. the figure most commonly quoted. Iron bars are quieter but strong at 3.159c., Philadelphia.

**Structural Material.**—Quotations for shapes range from 3.409c. to 3.659c., Philadelphia, but the lower price is to be found only in quarters where shipments are being prorated among regular customers, many of whom are not getting all they want. Another maker quotes 3.409c. as a nominal price but asserts he has none to sell. An Eastern mill, which asks 3.659c., Philadelphia, has done business at that figure. It reports no let-up in demand and booked in December more tonnage than it can turn out in two months. It is believed that awards will be made very soon on bids submitted on improvements to be made at the Newport News Navy Yard. It has estimated that the material needed may run as high as 15,000 tons. It is understood that the New York Shipbuilding Company, Camden, N. J., has closed with the McClintic-Marshall Company for 7000 tons required for improvements to the shipbuilding plant. The Snare & Trieste Company will

supply about 3000 tons required by the Cherry Street pier, this city.

**Billets.**—The situation is stronger than ever, with soft open-hearth rerolling billets quoted at \$60 to \$65 and forging steel at \$75 to \$85.

**Sheets.**—Light gage sheets are becoming very scarce. For sheets of all gages the demand is strong. No. 10 blue annealed are quoted at 4.909c., Philadelphia.

**Coke.**—The quotation for spot furnace coke changes from day to day, and prices are mentioned which seem impossible. While \$9.50 to \$10 would seem to be a rational quotation for spot furnace, \$12, and even \$15, per net ton at oven have been quoted. Contract furnace is quoted at \$4.50 to \$5, but no one wants to do business. Prompt foundry is quoted at \$10 to \$11 per net ton at oven, and contract at \$6.50 to \$7.50. No relief from the sparse shipments has yet been experienced. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Moun-tain, \$1.65.

**Old Material.**—The market has been inactive, and not much is expected to happen until January is under way. Heavy melting steel has been offered at \$24, but the mills would not consider acceptance. Rerolling rails have sold at \$30 and iron rails at \$28. The recent peace talk, holidays and new car regulations are together held responsible for the situation. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$23.00 to \$24.00
Old steel rails, rerolling.....	30.00 to 31.00
Low phos. heavy melting steel scrap.....	33.00 to 36.00
Old steel axles (for export).....	45.00
Old iron axles (for export).....	45.00
Old iron rails.....	28.00 to 29.00
Old carwheels.....	22.00 to 22.50
No. 1 railroad wrought.....	27.00 to 28.00
Wrought-iron pipe.....	18.00 to 19.00
No. 1 forge fire.....	16.50 to 17.50
Bundled sheets.....	16.50 to 17.50
No. 2 busheling.....	13.00 to 14.00
Machine-shop turnings.....	13.50 to 14.00
Cast borings.....	14.50 to 15.00
No. 1 cast.....	21.00 to 22.00
Grate bars, railroad.....	16.00 to 16.50
Stove plate.....	17.00 to 17.50
Railroad malleable.....	18.50 to 19.00

## Chicago

CHICAGO, ILL., Dec. 27, 1916.—(By Wire.)—A holiday season let-down is apparent in some of the activities of the market, but quietness attributable to that cause is overshadowed by the concern which is being occasioned by coal and coke shortage and the failure of transportation facilities. Manufacturing plants are crippled for power, foundries and blast furnaces are working from day to day on coke. One stack has already banked, while bad weather has multiplied existing delays due to car shortage. The principal buying of the week was for track work, and includes about 25,000 tons of rails, 15,000 tons of rail fastenings and about 150,000 kegs of spikes and bolts. It was a light week for shapes, plates and bars although there is a continuous demand for the latter from the manufacturing trade. A sharp break in the prices of scrap is coincident with a general liquidation, and consumers are limiting themselves to the offerings at concessions.

**Track Supplies.**—Buying of rails and track accessories was the important activity of the week. Michigan United Railways bought about 18,000 tons of standard section rails for interurban service, and other small lots brought the total for the week to about 25,000 tons. Purchases of rail fastenings totaled 15,000 tons, and contracts for spikes and bolts aggregated 150,000 kegs. Quotations are as follows: Standard railroad spikes, 3.50c. to 3.60c., base; track bolts with square nuts, 4c. to 4.50c., base, all in carloads, Chicago; tie-plates, \$55 to \$60, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, \$38, base; open hearth, \$40; light rails, 25 to 45 lb., \$44; 16 to 20 lb., \$45; 12 lb., \$46; 8 lb., \$47; angle bars, 2.25c.

**Pig Iron.**—The market was very quiet throughout the week and prices were stationary. A sale of 450 tons of Northern iron at \$30 is noted, and several small lots of Southern changed hands on the basis of \$23, Birmingham, for No. 2. Blast furnaces in the Chicago



district are feeling the pinch of coke shortage, and one stack at Milwaukee has already been banked, while some of the steel-making iron furnaces are facing a like necessity. The offerings of pig-iron sellers are only in comparatively small lots, and an inquiry of size would with difficulty find accommodation. For Lake Superior charcoal iron we quote delivery prices at Chicago to include a freight rate of \$1.75. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic irons, which are f.o.b. furnace, and do not include a switching charge averaging 50c. per ton.

Lake Superior charcoal, Nos. 2 to 5.....	\$31.75 to \$32.75
Lake Superior charcoal, No. 1.....	32.25 to 33.25
Lake Superior charcoal, No. 6 and Scotch .....	32.75 to 33.75
Northern coke foundry, No. 1.....	30.50
Northern coke foundry, No. 2.....	30.00
Northern coke foundry, No. 3.....	29.50
Northern high phosphorus foundry.....	28.00
Southern coke No. 1 f'dry and 1 soft .....	27.50 to 28.50
Southern coke No. 2 f'dry and 2 soft .....	27.00 to 28.00
Malleable Bessemer .....	30.00
Basic .....	30.00
Low phosphorus .....	40.00
Silvery, 8 per cent.....	35.50 to 36.00
Bessemer ferrosilicon, 10 per cent.....	40.50 to 42.50

**Structural Material.**—Contracts taken by bridge and structural shops last week totaled about 6000 tons, of which the more important work includes 1850 tons for Chicago, Burlington & Quincy bridges and 2230 tons for New York Central Lines bridges, the former going to the American Bridge Company and the latter to the Stroebe Steel Construction Company. Christopher & Simpson took a 400-ton building for Armour & Co., and the Jennet Bridge Company 560 tons for a theater building, Chicago. James Stewart & Co. let 300 tons for a sugar factory at Moroni, Utah. For plain material from mill the leading interest has announced an advance of \$2 per ton for indefinite delivery and on second quarter reservation some of the independent mills are now entering specifications at 3.25c., Pittsburgh. We quote for Chicago delivery of structural steel from mill, 3.289c. to 3.439c.

We quote for structural steel out of jobbers' stocks for Chicago delivery 3.70c.

**Plates.**—New inquiry is reduced to imperative necessities, the mill situation making any other efforts to secure material fruitless. The price for contracts for indefinite delivery has been advanced \$2 per ton, and for early shipment quotations continue to range from 4.50c. to 6c., depending upon the size of plates required and the delivery. We quote for Chicago delivery of plates from mill, at its convenience, 3.789c.; for prompt shipment, 4.689c. to widths up to 72 in., and for wide plates, 4.939c. to 5c.

We quote for Chicago delivery of plates from jobbers' stocks, 4.35c.

**Sheets.**—Makers of sheets continue to be importuned by their regular customers for further supplies of material, and if inquiry received represents actual needs many users of sheets are being forced to curtail operations, for the sheets are not to be had. We quote, for Chicago delivery, No. 10 blue annealed, 4c. to 4.50c.; box annealed, No. 16 and lighter, 4.50c. to 5c.; No. 28 galvanized, 6.50c. to 7c. These quotations are minimum prices for contracts. Early shipment quotations are \$5 to \$10 per ton higher.

Further advances in the prices of galvanized sheets from store have been announced and we quote for Chicago delivery out of stock, regardless of quantity, as follows: No. 10 blue annealed, 4.50c.; No. 28 black, 5c.; No. 28 galvanized, 7c.

**Cast-Iron Pipe.**—The award of 1500 tons of pipe at St. Paul is understood to have been made to the National Cast Iron Pipe Company. New lettings announced include 1600 tons at Sioux City, Iowa; 400 tons at Madison, Wis.; 250 tons at Portland, Ore., and 300 tons at Fort Wayne, Ind. We quote as follows, per net ton, Chicago: Water pipe, 4-in., \$44.50; 6-in. and larger, \$41.50, with \$1 extra for class A water pipe and gas pipe.

**Bars.**—Inquiry for mild steel bars from the general manufacturing trade is continuous, but the inability of the mills to accommodate users restricts business to an almost negligible volume. Prices are up \$2 per ton. Inquiries for large rounds for the manufacture

of munitions are still being received, including one for 20,000 tons. Local rail-carbon rerolling mills are practically out of the market, and recent sales have been on the basis of 3.25c. at the mill. We quote mill shipment, Chicago, as follows: Bar iron, 3c. to 3.25c.; soft steel bars, 3.189c. to 3.439c.; hard steel bars, 3.25c.; shafting, in carloads, 20 per cent off; less than carloads, 15 per cent off.

We now quote store prices for Chicago delivery as follows: Soft steel bars, 3.60c.; bar iron, 3.60c.; reinforcing bars, 3.60c., base, with 5c. extra for twisting in sizes  $\frac{1}{2}$  in. and over and usual card extras for smaller sizes; shafting list plus 5 per cent.

**Rivets and Bolts.**—The excess of demand over the supply of bolts and nuts available for anything approaching prompt delivery is such as to establish a uniformity of quotations such as has rarely existed in this trade. A further lowering of discounts is announced this week and we have revised our quotations accordingly. We quote as follows: Carriage bolts up to  $\frac{3}{4}$  x 6 in., rolled thread, 40-10; cut thread, 40-2 $\frac{1}{2}$ ; larger sizes, 30-5; machine bolts up to  $\frac{3}{4}$  x 4 in., rolled thread, with hot pressed square nuts, 50; cut thread, 40-10; large size, 35-5; gimlet-point coach screws, 50; hot pressed nuts, square, \$2.50 off per 100 lb.; hexagon, \$2.60 off. Structural rivets,  $\frac{3}{4}$  to 1 $\frac{1}{4}$  in., 4.15c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Store prices are as follows: Structural rivets, 4.50c.; boiler rivets, 4.60c.; machine bolts up to  $\frac{3}{4}$  x 4 in., 40-10-5; larger sizes, 40; carriage bolts up to  $\frac{3}{4}$  x 6 in., 40-7 $\frac{1}{2}$ ; larger sizes, 35; hot pressed nuts, square, \$3, and hexagon, \$3 off per 100 lb.; lag screws, 50.

**Old Material.**—The liquidation of stocks of scrap in the hands of dealers and brokers continued through last week, and this activity was augmented by short sales in considerable quantity. A further break in prices was the natural accompaniment. At present, sales to consumers are for the most part limited to material coming in on track and for this scrap prices are such as the urgency of the circumstances dictates. There is a considerable dealer activity in connection with the covering of short sales. Additional railroad offerings include 3000 tons from the Great Northern; 1500 tons from the Burlington; 1000 tons from the Soc and 500 tons from the Chicago & Eastern Illinois. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails .....	\$27.00 to \$28.00
Relaying rails .....	30.00 to 31.00
Old carwheels .....	20.00 to 21.00
Old steel rails, rerolling .....	27.00 to 28.00
Old steel rails, less than 3 ft. ....	25.00 to 26.00
Heavy melting steel scrap .....	21.50 to 22.00
Frogs, switches and guards, cut apart ..	21.50 to 22.00
Shoveling steel .....	18.00 to 19.00
Steel axle turnings .....	14.00 to 14.50
Per Net Ton	
Iron angles and splice bars .....	\$27.50 to \$28.00
Iron arch bars and transoms .....	28.00 to 29.00
Steel angle bars .....	20.50 to 21.00
Iron car axles .....	30.00 to 37.00
Steel car axles .....	40.00 to 41.00
No. 1 railroad wrought .....	23.50 to 24.00
No. 2 railroad wrought .....	22.50 to 23.00
Cut forge .....	22.00 to 22.50
Pipes and flues .....	14.00 to 14.50
No. 1 busheling .....	17.25 to 17.75
No. 2 busheling .....	13.00 to 13.50
Steel knuckles and couplers .....	22.50 to 23.00
Steel springs .....	23.50 to 24.00
No. 1 boilers, cut to sheets and rings ..	13.00 to 13.50
Boiler punchings .....	18.50 to 19.00
Locomotive tires, smooth .....	23.00 to 23.50
Machine-shop turnings .....	9.50 to 10.00
Cast borings .....	9.00 to 9.50
No. 1 cast scrap .....	15.50 to 16.50
Stove plate and light cast scrap .....	12.50 to 13.00
Grate bars .....	13.50 to 14.00
Brake shoes .....	13.50 to 14.00
Railroad malleable .....	18.00 to 19.00
Agricultural malleable .....	15.50 to 16.00

The first of three 600-ft. Lake freight boats that are being built for the Pittsburgh Steamship Company will be launched at the Lorain yards of the American Shipbuilding Company, Jan. 6. It will be christened Eugene W. Pargny, in honor of the president of the American Sheet & Tin Plate Company. The other two vessels, when launched, will be named for August Ziesing, president American Bridge Company, and Homer D. Williams, president Carnegie Steel Company. One of these boats is being built by the American Shipbuilding Company and the other by the Great Lakes Engineering Works.

## Cleveland

CLEVELAND, OHIO, Dec. 26, 1916.

**Iron Ore.**—Sales aggregating about 200,000 tons have been made in the past few days and several small lot inquiries are pending. These orders, however, will probably not be placed until after the holidays. We quote prices as follows, delivered lower Lake ports: Old range Bessemer, \$5.95; Mesaba Bessemer, \$5.70; old range non-Bessemer, \$5.20; Mesaba non-Bessemer, \$5.05.

**Pig Iron.**—With the holiday season and peace talk, the market has quieted down and there is practically no inquiry. Jobbing foundries and other consumers who have not covered for their last half requirements are following a waiting policy. The Cromwell Steel Company, which recently came into the market for 37,000 tons of basic iron for delivery next year, starting with May for its new plant in Lorain, Ohio, will probably defer buying. The car situation shows no improvement. Several Ohio furnaces have been banked because of inability to secure coke, and furnaces having by-product plants are experiencing about as much trouble in getting coal as others are having in getting coke. Many foundries are not getting pig-iron deliveries as needed. Practically all shipments of Southern iron are being held up by embargoes. The Ohio railroads are refusing pig iron from connecting lines in Cincinnati. Prices are unchanged. Northern foundry iron is quoted at \$31 for No. 2, and Southern iron at \$23 to \$25, Birmingham, for No. 2 for the first half, and \$22 to \$23.50 for the last half. Virginia iron is higher, being quoted at \$29, at furnace, for prompt shipment. We quote prices as follows, f.o.b. Cleveland:

Bessemer .....	\$35.95
Basic .....	30.95
Northern No. 2 foundry .....	31.30
Southern No. 2 foundry .....	\$26.00 to 29.00
Gray forge .....	29.95
Ohio silvery, 8 per cent silicon .....	38.62 to 39.62
Standard low phos., Valley furnace ..	50.00 to 51.00

**Coke.**—Many foundries are having difficulty in getting coke as fast as needed because of the car situation, and some have been compelled to partly suspend operations the past few days because of the lack of fuel. Others are securing their coke by hauling it in wagons from railroad sidings, the railroads being unable to deliver it to its destination. There is a fair demand for foundry coke for prompt shipment, and it is quoted at \$10 per net ton at oven. For first half contracts quotations range from \$7 to \$7.50. A Cleveland furnace interest has paid as high as \$11 for furnace coke for prompt shipment.

**Finished Iron and Steel.**—Peace talk has so far had little effect on the steel market, although some consumers who had inquiries out for steel for extended delivery are now holding off. The demand for steel for early delivery continues heavy. Lake shipyards are figuring on a number of foreign inquiries for boats. The Wheeling & Lake Erie Railroad has placed 5000 tons of rails for 1918 delivery and an inquiry has come out for 5000 to 6000 tons of light rails for France. The Wellman-Seaver-Morgan Company, Cleveland, has been awarded the superstructure for a floating crane for the Mare Island Navy Yard, requiring 700 tons of steel, which has just been placed. The Navy Department will erect a pontoon which will require 1000 tons. The demand for plates continues heavy, and a Cleveland mill is taking considerable business at 5c., Pittsburgh, for early delivery, quoting as high as 6c. in some cases. A Pittsburgh mill has advanced its price for tank plates to 4.75c. to 5c. Large inquiries for plates for export are coming out. Hard steel bars are firmer and are now quoted at 3.25c. by one mill. Sheets are apparently getting scarcer. A Cleveland jobber a few days ago wrote to 14 mills for sheet prices and only one would make quotations, its price being 5c. for black and 7c. for galvanized. Deliveries on sheet bars are becoming worse because of the railroad embargoes, and some Ohio mills have been forced to curtail production. Temporary shutdowns of other mills have been necessitated because of the lack of coal. The Stark Rolling Mill Company, Canton, Ohio, has shut down its 18 hot mills to Jan. 1. One Cleveland mill is temporarily out of the market on blue annealed sheets. We quote sheets at 4.50c. to 5.50c. at mill, for

No. 28 black; 4.25c. to 4.75c. for No. 10 blue annealed, and 6.50c. to 7.50c. for No. 28 galvanized. Cleveland warehouse prices have been advanced to 3.75c. for steel bars under 2 in., 3.95c. for structural material, 4.60c. for plates, and 4.75c. for hoops.

**Bolts, Nuts and Rivets.**—Another advance in bolt and nut prices of about 5 per cent was made last week. In addition, manufacturers have decided to hereafter make an extra charge of 10 per cent for V threaded bolts, and 50c. per 100 lb. for nuts. The U. S. standard bolts and nuts are now generally used so that the demand for bolts and nuts with V threads has become quite light. A heavy volume of bolt and nut business is coming out, largely in contracts for the first half. Specifications for rivets continue heavy. We quote rivets at 4.25c., Pittsburgh, for structural and 4.35c. for boiler. Bolt and nut discounts are as follows:

Common carriage bolts,  $\frac{3}{4}$  x 6 in., smaller or shorter, rolled thread, 40 and 10; cut thread, 40 and 2 $\frac{1}{2}$ ; larger or longer, 30 and 5. Machine bolts with h.p. nuts,  $\frac{3}{4}$  x 4 in., smaller or shorter, rolled thread, 50; cut thread, 40 and 10; larger or longer, 35 and 5. Lag bolts, cone point, 50. Square and hexagon h.p. nuts, blank, \$2.50 off the list; tapped, \$2.30 off. C.p.c. and t. hexagon nuts, all sizes, blank, \$2.25 off; tapped, \$2.00 off. Cold pressed semi-finished hexagon nuts, 50, 10 and 5 off.

**Old Material.**—The market has quieted down materially for the holiday season, and peace talk has had somewhat of a depressing effect. Considerable material has come out that was apparently being held for higher prices. Heavy melting steel, which recently sold at \$27 to \$27.50 in Cleveland, is now being quoted at \$23 to \$24. Carwheels are about \$2 per ton lower and prices on borings, turnings, cast scrap and a few other grades are slightly easier. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Steel rails .....	\$23.50 to \$24.00
Steel rails, rerolling .....	28.00 to 29.00
Steel rails under 3 ft. ....	29.00 to 30.00
Iron rails .....	31.00 to 32.00
Steel car axles .....	50.00 to 52.00
Heavy melting steel .....	26.00 to 24.00
Carwheels .....	21.00
Relaying rails 50 lb. and over ..	37.00 to 38.00
Agricultural malleable .....	16.50 to 17.00
Railroad malleable .....	22.50 to 23.00
Steel axle turnings .....	17.00 to 17.50
Light bundled sheet scrap .....	14.50 to 15.00

Per Net Ton	
Iron car axles .....	\$47.00 to \$48.00
Cast borings .....	10.25 to 10.50
Iron and steel turnings and drillings ..	10.00 to 10.25
No. 1 busheling .....	17.50 to 18.00
No. 1 railroad wrought .....	26.00 to 27.00
No. 1 cast .....	18.50 to 19.00
Railroad grate bars .....	14.50 to 15.00
Stove plate .....	14.50 to 15.00

## Buffalo

BUFFALO, N. Y., Dec. 26, 1916.

**Pig Iron.**—Transactions have been confined largely to buying for emergency use. The aggregate of sales is exceedingly small, owing to limited amount of iron available and abnormally congested freight conditions resulting from severe weather, not to mention the scarcity of cars and labor as well as shortage of coke. Furnaces find it very difficult to get out shipments at all, as temporarily only a small proportion of cars requisitioned for loading can be supplied by the railroads. Local shipping troubles are intensified by the operation of the new rule governing the interchange of cars, which requires prompt return of cars to railroad owning them. Some users of malleable iron are obliged to substitute charcoal iron where this is procurable. Two stacks of the district have been obliged to bank for a few days owing to the inability to secure coke held up in transit by heavy snows. Most producers of the district have no coke iron to sell except for last half or last quarter delivery and only a small aggregate tonnage at that. Everything available is held at \$35 per ton, flat, at furnaces for all grades. Some Southern iron has been sold for second and third quarter delivery in this vicinity at about the same prices as Northern iron or a shade lower owing to fact that local furnaces were unable to make the deliveries required.

**Finished Iron and Steel.**—Operating departments have been seriously affected by car shortage and em-



bargoes, and consumers are thus very much handicapped. Many shipments have been on the way for three to four weeks though they normally require only the same number of days. Mill agencies have advanced prices \$2 per ton on bars, shapes and plates. Warehouse prices also advanced \$2 on bars and shapes and \$5 on plates. All mill prices are largely nominal with very few real transactions reported, owing to the unwillingness of mills to take on additional tonnage and to the somewhat more conservative stand of buyers. There is little surplus stock in the hands of users, practically everything moving forward going into actual consumption. A few contracts have been made for the second quarter for bars, plates and shapes, but the producer shows no disposition to solicit business on the basis of present prices.

**Old Material.**—The usual holiday lull in buying prevails, but a number of good sized inquiries for heavy melting steel are out for delivery over the first quarter. There is an absolute shortage in this grade and all signs point to prices again ascending for this and other grades. Shipments have been held up on account of shortage of cars and severe weather conditions. There is no change in last week's prices and we quote dealers' asking prices, per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	\$26.00 to \$27.00
Low phosphorus	32.00 to 34.00
No. 1 railroad wrought	30.00 to 31.00
No. 1 railroad and machinery cast	23.00 to 24.00
Iron axles	45.00
Steel axles	45.00
Carwheels	23.00 to 24.00
Railroad malleable	23.00 to 24.00
Machine shop turnings	11.50 to 12.00
Heavy axle turnings	17.50 to 18.00
Clean cast borings	11.50 to 12.00
Iron rails	25.00 to 26.00
Locomotive grate bars	15.50 to 16.00
Stove plate	16.00 to 16.50
Wrought pipe	17.00 to 17.50
No. 1 busheling scrap	21.50 to 22.50
No. 2 busheling scrap	15.00 to 15.50
Bundled sheet scrap	15.00 to 16.00

## St. Louis

ST. LOUIS, MO., Dec. 26, 1916.

**Pig Iron.**—The market showed no softening, though there was relatively little buying. Inventories and the holidays were taking the attention, a fact which the halt in buying allowed. All consumers are using material ahead of their expected requirements and are affected seriously by the car shortage. Basic iron is entirely out of the market so far as representatives here are concerned, none being in position to take on any business.

**Coke.**—Some especially urgent small lots were handled, according to some unconfirmed statements, at as high as \$15 per ton for immediate delivery. The price of \$10 to \$10.50 per net ton at Connellsville ovens continues the figure for best selected 72-hr. coke for immediate and near future delivery. The by-product cokes of this territory are entirely out of the market, having been sold up for most of the coming year.

**Finished Iron and Steel.**—Specifications remain heavy, but there is little disposition to urge far future contracts, which the mill representatives are also discouraging. Standard section steel rails for 1918 delivery continue to be sought; a lot of 2500 tons was the largest bought in the week. Movement out of warehouse is large and consumers are willingly paying the high prices. We quote for stock out of warehouse as follows: Soft steel bars, 3.65c.; iron bars, 3.55c. to 3.60c.; structural material, 3.65c.; tank plates, 4.40c.; No. 10 blue annealed sheets, 4.55c.; No. 28 black sheets cold rolled, one pass, 5.15c.; No. 28 galvanized sheets, black sheet gage, 7.10c.

**Old Material.**—The market softened somewhat in the week, the big consumers proving that they are willing to buy only as prices are made attractive, and the dealers caught short on the recent sharp advance having measurably covered themselves. Local prices are now more nearly in line with the quotations of other scrap centers than they have been for some weeks. Buying for Eastern and Northern interests has also sagged somewhat. Relaying rails are entirely out of

the market and unobtainable at any price, though there is considerable inquiry for them. We quote dealers' prices, f.o.b. customers' works, St. Louis industrial district, as follows:

Per Gross Ton	
Old iron rails	\$27.00 to \$27.50
Old steel rails, re-rolling	27.50 to 28.00
Old steel rails, less than 3 ft.	27.00 to 27.50
Relaying rails, standard section, subject to inspection	33.00 to 34.00
Old carwheels	20.50 to 21.00
No. 1 railroad heavy melting steel scrap	24.00 to 24.50
Heavy shoveling steel	20.00 to 20.50
Ordinary shoveling steel	18.50 to 19.00
Frogs, switches and guards cut apart	24.00 to 24.50
Ordinary bundled sheet scrap	13.50 to 14.00

Per Net Ton	
Iron angle bars	\$26.00 to \$26.50
Steel angle bars	22.00 to 22.50
Iron car axles	36.50 to 37.00
Steel car axles	37.50 to 38.00
Wrought arch bars and transoms	27.50 to 28.00
No. 1 railroad wrought	24.50 to 25.00
No. 2 railroad wrought	23.50 to 24.00
Railroad springs	23.50 to 24.00
Steel couplers and knuckles	24.00 to 24.50
Locomotive tires, 42 in. and over, smooth inside	26.00 to 26.50
No. 1 dealers' forge	19.00 to 19.50
Cast-iron borings	9.00 to 9.50
No. 1 busheling	17.50 to 18.00
No. 1 boilers, cut to sheets and rings	14.00 to 14.50
No. 1 railroad cast scrap	15.00 to 15.50
Stove plate and light cast scrap	10.50 to 11.00
Railroad malleable	16.50 to 17.00
Agricultural malleable	14.00 to 14.50
Pipes and flues	15.00 to 15.50
Heavy railroad sheet and tank scrap	14.50 to 15.00
Railroad grate bars	12.00 to 12.50
Machine shop turnings	9.50 to 10.00
Heavy axle and tire turnings	12.50 to 13.00

## Birmingham

BIRMINGHAM, ALA., Dec. 26, 1916.

**Pig Iron.**—Several sales of prompt delivery foundry iron have been made by furnace interests at \$25, with one sale of 600 tons for second half delivery at the same figure. One iron company, which was selling at \$23 for last half, advanced about Dec. 20 to \$25 for any delivery. That is now the basis of at least two furnace companies, while the largest foundry producer and one other quote a minimum of \$24 for all deliveries. The leading interest is understood to have made additional sales of second half under the prices above mentioned, but they are exceptional, as it has also sold early delivery iron at \$25. It is established that prompt delivery iron ranges around \$24 and \$25 with very little last half iron to be had under the first figure. All interests are so well booked that none is soliciting business. Basic orders, if accepted, would be at a higher range than foundry. Several additional sales for export at \$25 were made, and there has been a brisk inquiry in that direction. The pipe people are expected to enter the market in the not distant future, but show no disposition to do so now. The week's sales were not large in volume and the average price obtained for all deliveries was probably around \$24. The Southern melt is at maximum. The holidays will be short, manufacturers being anxious to fill orders with promptness. We quote, per gross ton, f.o.b. furnaces, as follows:

No. 1 foundry and soft	\$24.50 to \$25.50
No. 2 foundry and soft	24.00 to 25.00
No. 3 foundry	23.50 to 24.50
No. 4 foundry	23.25 to 24.25
Gray forge	23.00 to 24.00
Basic	24.50 to 25.50
Charcoal	25.00 to 26.00

**Cast-Iron Pipe.**—Orders are being restricted to small quantities for filling in. Manufacturers must soon get new business or curtail operations. Fortunately the rise in price of pig iron came at the usually dull pipe-making season. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$39; 6-in. and upwards, \$36, with \$1 added for gas pipe and special sizes.

**Coal and Coke.**—Spot standard beehive coke is selling at \$8.50 to \$10 per net ton. Bookings at that price for Texas, general Southern delivery and California were made during the week by at least two makers. Furnace coke would bring from \$4 to \$4.50 per ton. Steam coal ranges around \$3 per ton. The Imperial Coal Company will at once open a 1000-ton mine at Bradford, where it will also repair and light 100 bee-



hive coke ovens to make coke for a Mexican smelter. The Alabama Company is to open a new mine at Searles.

**Old Material.**—The scrap market has softened for no special reason, the demand being as good as ever. Some ascribe the weakening to stock market fluctuations. At any rate, during the past week the same consumer bought a special grade from a dealer at \$20 and two days later obtained 700 additional tons at \$18. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old steel axles.....	\$35.00 to \$36.00
Old steel rails.....	19.00 to 20.00
No. 1 wrought.....	19.00 to 20.00
Heavy melting steel.....	17.00 to 18.00
No. 1 machinery.....	16.00 to 17.00
Carwheels.....	16.00 to 17.00
Tram carwheels.....	15.00 to 16.00
Stove plate and light.....	12.50 to 13.00

## Cincinnati

CINCINNATI, OHIO, Dec. 27, 1916.—(By Wire.)

**Pig Iron.**—A Canadian consumer bought through a local merchant 3000 tons of Northern foundry iron for last half shipment. Local business is quiet, and only a few lots of foundry iron have been placed lately for either future or prompt shipment. No changes have been made in quotations, and if anything the market is a trifle stronger for nearby shipment. There is probably more resale iron in the South than was generally supposed, but a large tonnage of this has been quietly moved and is now in the hands of consumers, so that it will not figure in any future price adjustments. Southern furnaces quote from \$24 to \$25, Birmingham, for first half shipment and from \$23 to \$25 for last half. Several sales around 200 tons each have been made in Ohio and Indiana, but no contracts of any size are under consideration. About 500 tons of Northern foundry iron was taken by a central Ohio melter at \$30, Ironton, for last half delivery. An inquiry from Michigan calls for 1000 tons of mixed Northern and Southern foundry iron for last half. No interest is taken in either malleable or basic. Bessemer is hard to obtain at any price for nearby shipment, and all the way from \$35 to \$37 at furnace is quoted for any delivery next year. The Ohio silvery irons are also scarce, and the furnaces have practically withdrawn from the market for early delivery; based on an 8 per cent analysis, \$35 at furnace is considered minimum for last half movement. The Southern high silicon irons can be obtained at a lower figure, but no sales have come to light lately in this territory. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.....	\$26.40 to \$28.40
Southern coke, No. 2 f'dry and 2 soft.....	25.90 to 27.90
Southern coke, No. 3 foundry.....	25.40 to 27.40
Southern coke, No. 4 foundry.....	24.90 to 25.40
Southern gray forge.....	24.40 to 26.40
Ohio silvery, 8 per cent silicon.....	37.25 to 38.25
Southern Ohio coke, No. 1.....	31.76
Southern Ohio coke, No. 2.....	31.26
Southern Ohio coke, No. 3.....	30.76
Southern Ohio malleable Bessemer.....	31.26
Basic Northern.....	31.26
Lake Superior charcoal.....	28.70 to 29.70
Standard Southern carwheel.....	27.90 to 28.40

**Finished Material.**—The holiday season has reduced business to a considerable extent, although prices are holding at the same level as last week. The nearby rolling mills did not close down for the entire holidays, and are now in full operation. The mill price of No. 28 black sheets is 5c., Cincinnati or Newport, Ky., and from 6.90c. to 7.15c. for No. 28 galvanized. We quote local store prices as follows: No. 10 blue annealed sheets, 4.40c.; steel bars and small structural shapes, 3.70c.; structural material, 3.80c., base; rounds and squares, 2 in. and over, 4.25c.; flat bars, 1 in. and over, 4.25c.; cold-rolled shafting, 10 per cent plus list; wire nails, \$3.40 per keg, base; barb wire, \$4.40 per 100 lb., base.

**Coke.**—A few sales of foundry coke were made the past week as high as \$13 at oven. The scarcity of cars is a serious question with oven operators in all districts. Prompt prices depend almost entirely on the ability of operators to get sufficient rolling stock.

Some complaint is made as to the holdup in shipments, both on furnace and foundry coke.

**Old Material.**—Business is slow. While there has been a softening in prices, no definite changes were made last week. The following are dealers' prices, f.o.b. at yards, southern Ohio and Cincinnati:

Per Gross Ton	
Bundled sheet scrap.....	\$14.75 to \$15.25
Old iron rails.....	25.00 to 25.50
Relaying rails, 50 lb. and up.....	28.50 to 29.00
Rerolling steel rails.....	25.00 to 25.50
Heavy melting steel scrap.....	21.00 to 21.50
Steel rails for melting.....	21.00 to 21.50

Per Net Ton	
No. 1 railroad wrought.....	\$21.75 to \$22.25
Cast borings.....	7.00 to 7.50
Steel turnings.....	7.00 to 7.50
Railroad cast.....	16.50 to 17.50
No. 1 machinery cast.....	18.25 to 18.75
Burnt scrap.....	10.50 to 11.00
Iron axles.....	33.25 to 33.75
Locomotive tires (smooth inside).....	27.00 to 27.50
Pipes and flues.....	14.00 to 14.50
Malleable cast.....	15.00 to 15.50
Railroad tank and sheet.....	12.00 to 12.50

## New York

NEW YORK, Dec. 27, 1916.

**Pig Iron.**—Consumers have had little to do with the market, a condition rather due to the holiday quiet that was expected than to the talk of peace. While the New Haven Railroad has taken off its embargo the Pennsylvania Railroad has embargoed New York Harbor points east of Waverly, N. J., including Brooklyn, the order becoming effective Dec. 23. Foreign inquiry is still a factor, 15,000 tons of foundry iron being asked for in the past week on behalf of neutral countries on the Continent of Europe. Their inability to get British iron will continue to send these countries to the United States. Some small lots of Virginia iron were sold at \$29 for first half of 1917 and \$26 for second half. In the warrant market a few holders have been offering their warrants at \$22.50 for No. 2 iron at Birmingham. Bargain hunters might be interested at \$21 or less. A 3,000-ton sale of basic iron was made to a New Jersey interest for delivery in the first quarter of 1917 at a figure reported to be \$30 at eastern Pennsylvania furnace. The Eastern pig iron market is interested in the Bethlehem Steel Company's purchase of the five Lackawanna furnaces in the Lebanon Valley, since it is expected they will discontinue making foundry iron for the market, being confined to basic and Bessemer iron for use at South Bethlehem. We quote at tidewater for early delivery: No. 1 foundry, \$30 to \$31; No. 2X, \$29.50 to \$30.50; No. 2 plain, \$28.50 to \$29.50; Southern iron at tidewater, \$29 to \$30 for No. 1 and \$28 to \$29 for No. 2 foundry and No. 2 soft.

**Ferroalloys.**—Very few sales or inquiries for either British or domestic ferromanganese have appeared in the past week. The British product is quoted at \$164, seaboard, and the domestic is held at \$175, delivered. The immediate wants of most consumers are pretty well cared for and deliveries on contract are satisfactory. The extent to which the proposed arming of British merchant ships will affect the receipt of British ferromanganese is causing some speculation because, according to the plan, all British alloy would have to come by way of Halifax. The market for 20 per cent spiegeleisen is strong at about \$60, furnace, for forward delivery and it is reported that the material is hard to obtain for January delivery. The market for 50 per cent ferrosilicon is very strong, with contract material being sold at \$99 to \$100, depending on the quantity. Some sales for nearby delivery have been made as high as \$120 delivered.

**Finished Iron and Steel.**—Inquiries continue in the volume of late weeks and the price advances intimated in last week's issue as likely to happen have already taken place, though it is not clear in the case of these new prices, which are for far future shipment, that any considerable volume of business has been done. Thus it would seem for the immediate future at least that not only will general prices hold, but the tendency is upward. In fact one plate manufacturer is asking

5c. for tank quality at three to four months' delivery. Another is getting the same price for small lots in two or more weeks, while 4½c. Pittsburgh, appears to be the minimum for universal plates in two to six weeks. One recent sale covers 3,000 tons of ship plates to Japan over the last half of 1917 at more than 5c. and 10c. for the same shipment has been paid for no less than 1,000 tons of marine boiler steel. It is stated that there is still all of 150,000 tons of ship plates awaiting mill acceptance. Billets for shells are still under consideration. Besides the advance made by the United States Steel Corporation of \$2 per ton for bars, shapes, plates and hoops for future delivery, warehouse prices have gone up, a matter of \$2 per ton for bars and \$4 per ton for shapes. The business of the leading fabricator, both as regards inquiries and bookings, is reported to have been larger in December this year than in any previous December on record. New contracts, while not large, have totaled good figures. The American Bridge Company has taken 2,600 tons for the Baltimore & Ohio pier at Baltimore, Md., and 300 tons for a new building for the General Hospital at Philadelphia. The Baltimore Enamel & Novelty Company, Baltimore, Md., has awarded 300 tons for a new building, but the contractor's name is not made public. The American Bridge Company has bid on 200 tons for 4 bridges for the Philadelphia & Reading. Other new business before the market embraces 450 tons for a warehouse for Austin & Doten, Boston; 500 tons for a loft at Broad, South and Front Streets, New York City; 3,000 tons for the Cherry Street pier, Philadelphia, and 500 tons for the Tishman apartment on Eighty-fourth Street, New York City. An extension for the Abraham & Straus store, Brooklyn, 350 tons, is talked of. The largest new project will be bid upon Jan. 10, 1917, and will be for the Livonia Avenue line of the Public Service Commission for Brooklyn, taking 15,600 tons. We quote mill shipments of shapes in two to five months at 3.419c. to 3.669c., New York, at convenience of the mill 3.269c. New York, and warehouse shipments at a minimum of 3.95c., New York. We quote universal and ordinary tank plates at 4.169c. to 5.169c., New York, but Lloyd specification plates at 5.169c. to 6.169c., with little available before the third quarter of 1917 and for plates in the fourth quarter of 1917 and the first quarter of 1918 at 3.769c., New York. Out of store we quote 4.75c., New York, for plates under 36 in. in width and 5c. on wider plates. We quote mill shipments of steel bars at 3.169c. to 3.669c., New York, the lower price for indefinite delivery and the higher for small quantities in, say, three months. We quote mill shipments of bar iron at 3.169c., New York. Out of warehouse iron bars are 3.50c. and steel bars 3.85c., New York.

**Old Material.**—The market appears to be at a complete standstill. Brokers quote buying prices nominally as follows to local dealers and consumers, per gross ton, New York:

Heavy melting steel scrap (for eastern Pennsylvania shipment).....	\$20.00 to \$20.50
Old steel rails (short lengths) or equivalent .....	22.00 to 22.50
Relaying rails .....	37.00 to 38.00
Rerolling rails .....	27.50 to 28.00
Iron and steel car axles (for export) ..	45.00 to 47.00
No. 1 railroad wrought.....	25.00 to 26.00
Wrought-iron track scrap.....	22.00 to 22.50
No. 1 yard wrought, long.....	22.00 to 22.50
Light iron (nominal).....	6.50 to 7.00
Cast borings (clean).....	11.00 to 11.50
Machine shop turnings.....	9.50 to 10.00
Mixed borings and turnings.....	7.00 to 7.50
Wrought pipe (not galvanized or enameled) .....	16.50 to 17.00

Dealers' quotations to consumers of cast scrap are nominally as follows, per gross ton, New York:

No. 1 cast .....	\$22.00 to \$22.50
No. 2 cast .....	19.00 to 19.50
Stove plate .....	15.50 to 16.00
Locomotive grate bars .....	15.50 to 16.00
Old carwheels .....	21.50 to 22.00
Malleable cast (railroad).....	18.00 to 18.50

**Cast-Iron Pipe.**—Seasonable dullness prevails, although inquiry from private buyers is considerably greater than usual for the last week in December. Prices are maintained at \$41.50 per net ton, tidewater,

for carload lots of 6-in., class B and heavier, with class A and gas pipe taking an extra of \$1 per ton.

## British Steel Market

### Ferromanganese Stronger—Higher Quotations for Semi-Finished Steel

(By Cable)

LONDON, ENGLAND, Dec. 27, 1916.

The pig-iron market is generally firm but quiet. Tin plates are firmer and export business is more difficult. Ferromanganese is quoted at £36 upward. Higher terms are checking business in semi-finished steel and 4-in. billets for January-June delivery are quoted at about \$92 c.i.f. Liverpool. Wire rods for prompt shipment have been sold to France for £24 c.i.f. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 198 lb., f.o.b. Wales, 34s. 6d.
Steel black sheets, No. 28, export, f.o.b. Liverpool, £19 5s.
Hematite pig iron, f.o.b. Tees, 142s. 6d.
Sheet bars (Welsh) delivered at works in Swansea Valley, £15 5s. nominal.
Ferromanganese, £36 upward.
Ferrosilicon, 50 per cent, c.i.f., £30 against £27 last week.

(By Mail)

### Increasing Pig-Iron Output—Ferromanganese Stronger on Sales to Italy, France and Spain

LONDON, ENGLAND, Dec. 5, 1916.—The steel position generally is still difficult, though there is more hope of the enormous pressure of needs being met more successfully in the new year. Distinctly easier conditions have been experienced lately, however, in pig iron, even in hematite, though output on the Northwest Coast is still short of requirements. Additional relief, however, will be afforded there by four furnaces which are to be relighted shortly. In other directions endeavors to develop the output, combined with close official control of the exports, have certainly enabled much freer deliveries to be made to home consumers, whose needs now seem to be fairly well covered.

It has thus been possible to devote more attention to Allied countries' requirements in both Cleveland and hematite material, for which permits are more easily obtainable, so that this month's shipments may show an improvement. The total pig iron shipped from the Tees last month was only 31,656 tons (against 53,610 tons for October), of which 25,548 tons went to France, against 40,930 tons in October. The home demand has fallen off considerably and seems to be pretty well satisfied. There is no lack of forward inquiries, but producers are not eager to add to their commitments into next year.

It is understood that iron workers in the area covered by the Midland Iron and Steel Wages Board have been granted a further advance in wages of 5 per cent, the present rate of puddling being 17s. 3d. per ton, or the highest figure ever recorded.

The allocation of the deliveries of home semi-finished steel for special requirements is being, as far as can be gathered, increased further, so that the use in other directions looks like being reduced still more. The tin-plate mills are likely to be greatly handicapped in this respect, for it is thought that they will soon only draw about one-third of their normal supply of steel bars. American semi-finished steel rules very firm, the lowest terms quoted for 4-in. billets being \$70 for January-March delivery, f.o.b. Liverpool. There is a demand for wire rods, but the much higher prices asked (up to about £25 a ton, c.i.f.) make business impossible.

The pooling arrangement in the Welsh tin-plate trade has helped to consolidate the market, in spite of the unsatisfactory state of export business. Stock plates are not coming out so freely and prices are hardening, while better terms are secured for orders against class A work under the regulations in force. The output, of course, is bound to fall off further.

The fact that British producers of ferromanganese are already sold up for next quarter, and that the Continental demand continues, has stiffened the market considerably, although there is very little doing for America. Sales have been made to Italy, France and Spain at prices ranging up to about £35, f.o.b., for loose.

## Iron and Industrial Stocks

NEW YORK, Dec. 27, 1916.

Another period of pronounced liquidation overwhelmed the stock market the past week. It is stated that this outpouring of stocks was the greatest since the dark days of 1907. In one day, Thursday of last week, the sales on the New York Stock Exchange exceeded 3,000,000 shares, falling just short of a record. The immediate cause was the peculiar language used by Secretary of State Lansing in an effort to explain the peace note of President Wilson to the belligerent nations. It has been pointed out, however, that the underlying influence was the excessive speculation which had placed the stock market in a position to topple easily. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com., 24	- 28 3/4	Gulf States Steel,	
Allis-Chal., pref., 81	- 88 1/2	2nd pref., 108 1/2	- 115
Am. Can., com., 44	- 51 1/2	Harb-Walk. Refrac.,	
Am. Can., pref., 107 3/4	- 108 1/2	com., 120	
Am. Car & Fdy.,		Int. Har. of N. J.,	
com., 62	- 69 3/4	com., 118	- 123
Am. Car & Fdy.,		Int. Harv. Corp.,	
pref., 116 1/4		com., 83	- 90 1/4
Am. Loco., com., 67 1/4	- 80 1/4	La Belle Iron,	
Am. Loco., pref., 103	- 106 1/2	com., 74 1/2	- 81 1/4
Am. Ship, com., 53 1/2	- 62	Lacka. Steel., 73 3/4	- 89 1/2
Am. Ship, pref., 95	- 96	Lake Sup. Corp., 15	- 23 3/4
Am. Steel Fdries., 59	- 64	Midvale Steel., 51 3/4	- 60 3/4
Bald. Loco., com., 52	- 65 1/2	Nat. En. & Stm.,	
Bald. Loco., pref., 98 3/4	- 101 1/2	com., 24	- 32
Beth. Steel, com., 489	- 515	pref., 90 3/4	- 93 1/2
Beth. Steel, pref., 130	- 143 1/4	N. Y. Air Brake, 140	- 152 3/4
Cambria Steel., 110	- 115	Nova Scotia Stl., 105	- 125
Carbon Stl., com., 101	- 108	Pitts. Steel, pref., 100 3/4	- 101
Carbon Steel,		Pressed Stl., com., 69 1/4	- 78 1/4
1st pref., 100		Pressed Stl., pref., 102 1/4	- 103
Carbon Steel,		Ry. Steel Spring,	
2nd pref., 70	- 80	com., 46	- 52 1/4
Central Fdry.,		Ry. Steel Spring,	
com., 18	- 25 1/2	pref., 100	- 101
Central Fdry.,		Republic, com., 69 3/4	- 81 3/4
pref., 37	- 40	Republic, pref., 101	- 106 1/2
Chic. Pneu. Tool., 66	- 73	Sloss, com., 50 1/4	- 66
Colo. Fuel., 40 3/4	- 47 3/4	Un. Alloy Steel., 47	- 52
Cruc. Steel, com., 55 1/4	- 67 3/4	U. S. Pipe, com., 19	- 22
Cruc. Steel, pref., 113 1/4	- 114 1/4	U. S. Pipe, pref., 60 1/4	- 62
Deere & Co., pref., 98		U. S. Steel, com., 100 3/4	- 113
Driggs-Seabury, 45 1/2	- 56 1/2	U. S. Steel, pref., 117	- 120
Gen. Electric., 160 1/2	- 171 1/2	Va. I. C. & Coke, 45	- 50
Gt. No. Ore Cert., 32	- 39 1/4	Warwick, 9 1/2	- 9 3/4
Gulf States Steel, 100	- 137	Westing. Elec., 51 1/2	- 56
1st pref., 107			

## Dividends

The Cambria Steel Company, quarterly, 1 1/2 per cent, an increase from a basis of 5 per cent to 6 per cent per year; and extra dividend, 1 1/2 per cent, both payable Dec. 29.

The Atlantic Steel Company, regular quarterly, 1 1/2 per cent and extra 1 per cent on the common stock, payable Jan. 10.

The Sullivan Machinery Company, quarterly, 1 1/2 per cent and extra 1 per cent, payable Jan. 15.

The Spicer Mfg. Corporation, initial quarterly, 2 per cent on the first preferred stock and 2 per cent on the second preferred, both payable Jan. 1.

The Westinghouse Electric & Mfg. Company, quarterly, 1 3/4 per cent on the common stock, payable Jan. 31, an increase to a 7 per cent per year basis; also regular quarterly, 1 3/4 per cent, on the preferred, payable Jan. 15.

The Billings & Spencer Company, regular quarterly, 2 per cent, and extra 3 per cent, payable Jan. 1.

The American Screw Company, regular quarterly, 1 3/4 per cent, and extra 3 per cent, payable Dec. 30.

The Youngstown Sheet & Tube Company, regular quarterly, 1 3/4 per cent on the preferred, and 2 per cent on the common stock, payable Jan. 1. The directors have decided to recommend to the stockholders at the annual meeting of the company, to be held Feb. 6, a common stock dividend of 100 per cent. The company has \$20,000,000 of common stock outstanding and plans to increase this to \$40,000,000. The additional common stock, if issued, will be eligible to participate in dividends from Jan. 1.

H. Collier Smith, Detroit, has recently completed for an Eastern customer a gigantic rotary shear, weighing 17 1/2 tons, which will cut 3/4-in. steel plate in straight lines, curves and reverse curves, or cut holes in the center.

## Customs Decisions

### MARINE ENGINE PARTS

Action was taken by the Board of General Appraisers on a protest by A. E. Outerbridge & Co., New York, after the Court of Customs Appeals had remanded the case to the lower customs tribunal for further testimony. The importers had protested the collector's action in assessing duty on marine engine parts intended for installation in vessels building in the United States, or as ship equipment. Duty at the rate of 20 per cent had been imposed on the ground that the parts were not provided for in the paragraph covering engines, and that accordingly the parts were relegated to paragraph 167 dealing with "manufactures of metal, not specially provided for." Judge Hay said that the additional testimony taken by the board showed that all of the merchandise was incorporated in and formed a part of a completed engine. In view of this, the board sustained the claim that entry accrued at 15 per cent under the provision covering engines, instead of at the higher rate under the metal paragraph.

### PUMPS AND OTHER METAL SUPPLIES FOR VESSELS

C. B. Richard & Co., New York, protested the collector's action in levying 20 per cent duty on steam pumps, valves, guards, spring, studs, piston rods, rings and oil-bucket rings as manufactures of metal. It was claimed that the articles were intended as spare parts, and were to be used on board a vessel being constructed in an American shipyard. Free entry was claimed as ship's equipment under the terms of the Panama Canal act. The board held that a recent decision in the case of the Harlan & Hollingsworth Shipbuilding Corporation was applicable to the case, and the protest was sustained.

## Norway's Steel Exports and Imports in 1916

Norwegian imports of iron and steel in the first half of 1916 as compared with the like periods in 1915 and 1914 were as follows in metric tons:

	1914	1915	1916
Pig iron	17,400	16,400	41,300
Bars, rods and hoops	27,500	28,520	25,400
Plates and sheets	25,800	33,100	32,500
Tin plates and galvanized sheets	16,300	29,800	19,500
Wheels and axles	2,200	1,400	3,600

The increase in pig iron in 1916 is striking.

Important exports in the same half year periods were as follows in metric tons:

	1914	1915	1916
Ferrosilicon	2,521	3,525	10,906
Iron ore and iron-ore briquettes	272,000	192,300	173,700
Crude zinc	6,005	9,506	12,026

Norway's contribution of ferrosilicon has grown decidedly, and the same is true of zinc.

## Spain's Imports and Exports of Steel

Spain's imports and exports of iron and steel for the first six months of this year and of 1915 are reported as follows in metric tons:

	Imports, Jan. to June		Exports, Jan. to June	
	1916	1915	1916	1915
Pig iron	16,308	4,717	22,131	58,997
Castings	1,048	753	.....	.....
Finished steel	.....	.....	51,584	25,074
Rails, bars and plates	9,412	12,019	.....	.....
Tin plates	6,936	757	.....	.....

The Acme Steel Company, recently incorporated, proposes to erect a plant at Glassmere, Pa., for the manufacture of crucible tool steel. It will be in the market shortly for a steel building, also a 5-ton electric traveling crane, several furnaces, shears, bar mill and hammers. Specifications for all the equipment will be ready about Jan. 15, and inquiries should be sent to F. Denk, House Building, Pittsburgh, consulting engineer.



## Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30.7c.; Birmingham, Ala., 45c. Denver, pipe, 76.1c., minimum carload, 46,000 lb.; structural steel and steel bars, 83.6c., minimum carload, 36,000 lb. Pacific coast (by rail only), pipe, 65c.; structural steel and steel bars, 75c., minimum carload, 50,000 lb.; structural steel and steel bars, 80c., minimum carload, 40,000 lb. No freight rates are being published via the Panama Canal, as the boats are being used in transatlantic trade.

**Structural Material.**—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs,  $\frac{1}{4}$  in. thick and over, and zees 3 in. and over, 3c. to 3.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs less than $\frac{1}{4}$ in. thick, as per steel bar card, Sept. 1, 1909.	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.	.20 to .80
Deck beams and bulb angles.	.30
Handrail tees.	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.	.50
Cutting to lengths, under 1 ft.	1.55
No charge for cutting to lengths 3 ft. and over.	

**Plates.**—Tank plates,  $\frac{1}{4}$  in. thick, 6 in. up to 100 in. wide, 3.60c. to 5c., base, net cash, 30 days, or  $\frac{1}{2}$  of 1 per cent discount in 10 days, carload lots. Extras are:

### Quality Extras

	Cents per lb.
Tank steel	Base
Pressing steel (not flange steel for boilers)	.10
Boiler and flange steel plates	.15
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Locomotive firebox steel	.50
Marine steel, special extras and prices on application.	

### Gage Extras

Rectangular, $\frac{1}{4}$ in. thick, over 6 in. wide to 100 in. wide. Base	
Lighter than $\frac{1}{4}$ in., to 3/16 in., up to 72 in. wide.	.10
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 72 in. to 84 in.	.20
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 84 in. to 96 in.	.30
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 96 in. to 100 in.	.40
Lighter than $\frac{1}{4}$ in., including 3/16 in., over 100 in. to 102 in.	.45
Lighter than 3/16 in., including No. 8, up to 72 in. wide.	.15
Lighter than 3/16 in., including No. 8, over 72 in. to 84 in.	.25
Lighter than 3/16 in., including No. 8, over 84 in. to 96 in.	.35
Lighter than No. 8, including No. 10, up to 60 in. wide.	.30
Lighter than No. 8, including No. 10, over 60 in. to 64 in.	.35
Up to 72 in. and not less than 10.2 lb. per sq. ft. will be considered $\frac{1}{4}$ in.	
Over 72 in. must be ordered $\frac{1}{4}$ in. thick on edge, or not less than 11 lb. per sq. ft. to take base price.	
Over 72 in. wide, ordered less than 11 lb. per sq. ft., down to weight of 3/16 in., take price of 3/16 in.	
Over 72 in., ordered weight 3/16 in., take No. 8 price.	
Over 72 in., ordered weight No. 8, take No. 10 price.	

### Width Extras

Over 100 in. to 110 in. inclusive.	.05
Over 110 in. to 115 in. inclusive.	.10
Over 115 in. to 120 in. inclusive.	.15
Over 120 in. to 125 in. inclusive.	.25
Over 125 in. to 130 in. inclusive.	.50
Over 130 in.	1.00

### Length Extras

Universal plates 80 ft. long up to 90 ft. long.	.05
Universal plates 90 ft. long up to 100 ft. long.	.10
Universal plates 100 ft. long up to 110 ft. long.	.20

### Cutting Extras

No charge for rectangular plates to lengths 3 ft. and over.	
Lengths under 3 ft. to 2 ft. inclusive.	.25
Lengths under 2 ft. to 1 ft. inclusive.	.50
Lengths under 1 ft.	1.55
Circles 3 ft. in diameter to 100 in.	.30
Circles over 100 to 110 in. (width extra)	.35
Circles over 110 to 115 in. (width extra)	.40
Circles over 115 to 120 in. (width extra)	.45
Circles over 120 to 125 in. (width extra)	.55
Circles over 125 to 130 in. (width extra)	.80
Circles over 130 in. (width extra)	1.30
Circles under 3 ft., to 2 ft. inclusive.	.55
Circles under 2 ft., to 1 ft. inclusive.	.90
Circles under 1 ft.	1.85
Half circles take circle extras.	
Sketches not over four straight cuts, inc. straight taper	.10
Sketches having more than four straight cuts.	.20
Plates sheared to a radius take complete circle extras.	

\*Including extra for width.

**Wire Rods.**—Including chain rods, \$70 to \$75.

**Wire Products.**—Prices to jobbers effective Nov. 27: Fence wire Nos. 6 to 9, per 100 lb., terms 60 days or 2 per cent discount in 10 days, carload lots, annealed, \$2.95; galvanized, \$3.65. Galvanized barb wire and

staples, \$3.85; painted, \$3.15. Wire nails, \$3. Galvanized nails, 1 in. and longer, \$2 advance over base price; shorter than 1 in., \$2.50 advance over base price. Cement coated nails, \$2.90. Woven wire fencing, 53 per cent off list for carloads, 52 off for 1000-rod lots, 51 off for less than 1000-rod lots.

**Wrought Pipe.**—The following are the jobbers' carload discounts on the Pittsburgh basing card in effect from Dec. 4, 1916, all full weight:

Steel		Butt Weld		Iron	
Inches	Black	Galv.	Inches	Black	Galv.
$\frac{1}{8}$ , $\frac{1}{4}$ and $\frac{3}{8}$	59	32 $\frac{1}{2}$	$\frac{1}{8}$ and $\frac{1}{4}$	48	21
$\frac{1}{2}$	63	48 $\frac{1}{2}$	$\frac{3}{8}$	49	22
$\frac{3}{4}$ to 3	66	52 $\frac{1}{2}$	$\frac{1}{2}$	53	35
			$\frac{3}{4}$ to 1 $\frac{1}{2}$	56	40
Lap Weld		Reamed and Drifted			
2	59	46 $\frac{1}{2}$	1 $\frac{1}{4}$	42	27
2 $\frac{1}{2}$ to 6	62	49 $\frac{1}{2}$	1 $\frac{1}{2}$	48	34
7 to 12	59	45 $\frac{1}{2}$	2	49	35
13 and 14	49 $\frac{1}{2}$		2 $\frac{1}{2}$ to 4	51	38
15	47		4 $\frac{1}{2}$ to 6	51	38
			7 to 12	50	37
Butt Weld, extra strong, plain ends		Lap Weld, extra strong, plain ends			
$\frac{1}{8}$ , $\frac{1}{4}$ and $\frac{3}{8}$	55	37 $\frac{1}{2}$	$\frac{1}{8}$ , $\frac{1}{4}$ and $\frac{3}{8}$	48	31
$\frac{1}{2}$	60	47 $\frac{1}{2}$	$\frac{1}{2}$	53	40
$\frac{3}{4}$ to 1 $\frac{1}{2}$	64	51 $\frac{1}{2}$	$\frac{3}{4}$ to 1 $\frac{1}{2}$	57	42
2 to 3	65	52 $\frac{1}{2}$			
Lap Weld, extra strong, plain ends		Reamed and Drifted			
2	57	45 $\frac{1}{2}$	$\frac{1}{4}$ to 1 $\frac{1}{2}$ , butt.	51	34
2 $\frac{1}{2}$ to 4	60	48 $\frac{1}{2}$	1 $\frac{1}{4}$ , lap	37	21
4 $\frac{1}{2}$ to 6	59	47 $\frac{1}{2}$	1 $\frac{1}{2}$ , lap	43	28
7 to 8	55	41 $\frac{1}{2}$	2, lap	44	29
9 to 12	50	36 $\frac{1}{2}$	2 $\frac{1}{2}$ to 4, lap	47	32

To the large jobbing trade an additional 5 per cent is allowed over the above discounts, which are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized, but in some sections of the country discounts on less than carloads are three (3) points less (higher price) than the carload discount on both black and galvanized steel pipe.

On butt and lap weld sizes of black iron pipe, discounts for less than carload lots to jobbers are four (4) points lower (higher price) than carload lots, and on butt and lap weld galvanized iron pipe are five (5) points lower (higher price).

**Boiler Tubes.**—Discounts on less than carloads, freight to be added, effective from Nov. 1, 1916, except 3 to 4  $\frac{1}{2}$  in. steel from Nov. 20, are as follows:

Lap Welded Steel	Standard Charcoal Iron
1 $\frac{1}{2}$ in.	31
1 $\frac{3}{4}$ and 2 in.	43
2 $\frac{1}{4}$ in.	40
2 $\frac{1}{2}$ and 2 $\frac{3}{4}$ in.	46
3 and 3 $\frac{1}{4}$ in.	46
3 $\frac{1}{2}$ to 4 $\frac{1}{2}$ in.	46
5 and 6 in.	45
7 to 13 in.	42
1 $\frac{1}{2}$ in.	31
1 $\frac{3}{4}$ and 2 in.	43
2 $\frac{1}{4}$ in.	40
2 $\frac{1}{2}$ and 2 $\frac{3}{4}$ in.	46
3 and 3 $\frac{1}{4}$ in.	46
3 $\frac{1}{2}$ to 4 $\frac{1}{2}$ in.	46
5 and 6 in.	45
7 to 13 in.	42

Locomotive and steamship special charcoal grades bring higher prices.

1  $\frac{1}{2}$  in., over 18 ft., and not exceeding 22 ft., 10 per cent net extra.

2 in. and larger, over 22 ft., 10 per cent net extra.

**Sheets.**—Makers' prices for mill shipments on sheets of United States standard gage, in carload and larger lots, are as follows, 30 days net, or 2 per cent discount in 10 days:

### Blue Annealed Sheets

Nos.	Cents per lb.
Nos. 3 to 8	4.00 to 4.25
Nos. 9 to 12	3.75 to 4.00
Nos. 13 to 16	3.85 to 4.10
No. 17 and lighter gages are based on \$4.50 per 100 lb. for No. 28 Bessemer black sheets.	

### Box Annealed Sheets, Cold Rolled

Nos. 17 to 21	4.30 to 4.55
Nos. 22 and 24	4.35 to 4.45
Nos. 25 and 26	4.40 to 4.65
No. 27	4.45 to 4.70
No. 28	4.50 to 4.75
No. 29	4.55 to 4.80
No. 30	4.65 to 4.90

### Galvanized Sheets of Black Sheet Gage

Nos. 10 and 11	5.25 to 5.75
Nos. 12 to 14	5.35 to 5.85
Nos. 15 and 16	5.50 to 6.00
Nos. 17 to 21	5.65 to 6.15
Nos. 22 and 24	5.80 to 6.30
Nos. 25 and 26	5.95 to 6.45
No. 27	6.00 to 6.50
No. 28	6.25 to 6.75
No. 29	6.40 to 6.90
No. 30	6.55 to 7.05

### Tin Mill Black Plate

Nos. 15 and 16	4.05 to 4.20
Nos. 17 to 21	4.10 to 4.25
Nos. 22 to 24	4.15 to 4.30
Nos. 25 to 27	4.20 to 4.35
No. 28	4.25 to 4.40
No. 29	4.30 to 4.45
No. 30	4.30 to 4.45
Nos. 30 $\frac{1}{2}$ and 31	4.35 to 4.50

## Metal Markets

### The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		Tin, New York		Lead, New York		Spelter, New York	
Dec.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
20.....	32.00	32.00	41.62½	7.50	7.30	10.25	10.00
21.....	31.25	31.25	41.12½	7.50	7.30	10.00	9.75
22.....	31.00	31.00	40.50	7.50	7.30	9.75	9.50
23.....	31.00	31.00	.....	7.50	7.30	9.75	9.50
26.....	31.00	31.00	40.87½	7.50	7.30	9.75	9.50

NEW YORK, Dec. 27, 1916.

Resale copper, after being offered at concessions, is steadier, in a market that is quiet on all sides. Tin is lower and uncertain. Lead is dull, with the leading interest taking only February business, and that on the basis of average quotations for the month. Spelter has declined and is dull. Antimony continues quiet and is lower.

#### New York

**Copper.**—The lower prices which are quoted for both Lake and electrolytic are those named for resale metal by speculators and, to a limited extent, by consumers. The speculative side of the market is not of large proportions, but there has been some effort to realize profits, also endeavors to sell short on future positions. Since the price touched 31c. for prompt, and 30.50c. for January, it has become firmer and yesterday was fairly steady although dull. First quarter is quoted at 30c., and second quarter at 29c. to 29.50c. The producers, in view of their sold up condition, have not changed their quotations for any part of the first half, but it is understood that they are doing nothing. A demoralized market might follow concessions on their part. The London market was inactive yesterday because of the regular Boxing Day holiday, consequently no cables arrived. The New York Metal Exchange has been closed and no exports have been reported since last week. The entire market is awaiting developments.

**Tin.**—On Dec. 20 the market was active, 400 to 500 tons changing hands, mostly for May and June delivery, from the Far East, the average price paid being 40.50c. On Dec. 21 there was less activity, but still a fair amount of metal was dealt in. Since then, the market has been quiet to the point of dullness, with considerable uncertainty because of the lack of information from London. The trade is much concerned over the action of Great Britain in putting under the ban all shipping news relating to the departure and arrival of vessels in English ports. So far as the trade can see, the move means an interference with the statistics of tin afloat and to arrive which supply important guidance to importers and dealers. The New York quotation for spot Straits yesterday was 40.87½c.

**Lead.**—There is a scarcity of spot lead in the East, such as frequently exists, and premiums have been paid where immediate delivery from stock in New York was wanted. For January delivery 7.50c., New York, is the quotation of all interests, although the largest producer is not selling at this price. It will sell for February delivery, settlement to be on the basis of the average price for that month. The St. Louis quotation of the independents is about 7.30c., although 7.40c. has been done.

**Antimony.**—Extreme dullness is all that can be reported, with prices nominally ranging from 14c. to 14.25c. for Chinese and Japanese grades.

**Aluminum.**—Quotations for No. 1 virgin metal, 98 to 99 per cent pure, are easier at 60c. to 63c.

**Spelter.**—The market was steadier yesterday than it was last week, but it is not active by any means. The quotation for prompt at New York yesterday was 9.75c., and at St. Louis, 9.50c. Futures were sold late last week at low prices, orders having been placed for January to June at 9c. and 9.12½c., St. Louis, while first quarter sold at 9.25c., St. Louis. Since the low

point was touched, first quarter has sold at 9.37½c. to 9.50c., St. Louis. Dealers were the chief sellers while the market was declining, but to-day the producers are favorably disposed to take business. Western transportation conditions are causing a great deal of trouble all around.

**Old Metals.**—The market is very unsettled. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	29.00 to 31.00
Copper, heavy and wire.....	28.00 to 30.00
Copper, light and bottoms.....	25.00 to 26.00
Brass, heavy.....	17.50 to 18.50
Brass, light.....	14.00 to 15.00
Heavy machine composition.....	24.00 to 25.25
No. 1 yellow rod brass turnings.....	18.00 to 18.50
No. 1 red brass or composition turnings.....	17.00 to 19.00
Lead, heavy.....	7.00
Lead, tea.....	6.50
Zinc.....	7.50 to 8.00

#### Chicago

DEC. 26.—The general tendency of prices for non-ferrous metals continues downward. Offerings of resale copper at concessions have added special pressure, and tin prices have been progressively lower. The leading interest's quotations for lead are now the top of the market. We quote: Casting copper, 29.75c.; Lake copper, 31.75c.; tin, carloads, 41c., and small lots, 43c.; lead, 7.45c.; spelter, 9.75c.; sheet zinc, 21c.; Cookson's antimony, 50c.; other grades, 17c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 25c.; copper bottoms, 22.50c.; copper clips, 25c.; red brass, 22c.; yellow brass, 17c.; lead pipe, 5.75c.; zinc, 6c.; pewter, No. 1, 26c.; tinfoil, 32c.; block tin pipe, 36c.

#### St. Louis

DEC. 26.—The week was quiet, with a sagging tendency in quotations. The close to-day was on lead in carload lots 7.25c. bid and probably salable at 7.50c.; spelter, carload lots, nominal at 9.87½c. In less than carload lots: Lead, 7.90c.; spelter, 11.50c.; tin, 46c.; Lake copper, 34c.; electrolytic copper, 33.50c.; Asiatic antimony, 17c. In the Joplin district all ore prices were very weak as a result of the conditions prevailing in the metal market. On miscellaneous scrap metals we quote dealers' buying prices as follows: Light brass, 10.50c.; heavy yellow brass, 14c.; heavy red brass and light copper, 19c.; heavy copper and copper wire, 22c.; pewter, 25c.; tinfoil, 34c.; zinc, 7c.; lead, 5.50c.; tea lead, 4c.

#### Height Gage with a Vernier Attachment

The L. S. Starrett Company, Athol, Mass., has brought out a vernier height gage. The main bar of the gage is 10 in. long and has graduations which in conjunction with the vernier enable readings to 0.001 in. to be secured on measurements up to 8 in. high. The base is 2¼ in. long and 1 in. wide and is hardened with a view to securing long wear. The bottom of the base is recessed and the upper surface is ground at a right angle with the bar. An extension is furnished for the movable bar to enable reverse measurements to be taken from either side of the jaw and an attachment designed to permit measurements inside the frame of a jig to be taken or the depth of recesses to be measured is also furnished with the gage.

#### A Large Pinion of Noiseless Type

The Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., recently made a large pinion of the noiseless type. It is 21 in. in diameter with an 8-in. face and is designed to transmit 100 hp. at 425 r.p.m. While the pinion is not the largest one of the noiseless type that has been produced, the size and the fact that no metal shroud was employed make it interesting. The pinion is of the Bakelite Micarta-D gear material consisting of heavy duck bonded together with Bakelite by heating under heavy pressure.

The iron-ore exports from Algeria in the first nine months of 1916 were 739,288 tons, compared with 625,912 tons to Oct. 1, 1915.



### Large Orders for Locomotives

Orders for locomotives reported in the third week in December are the largest in many months and amount to 367. The American Locomotive Company has taken orders for 161 locomotives. Of these the French State Railways will take 100 80-ton consolidated locomotives each weighing 161,000 lb., and the Paris-Orleans Railroad will take 50 Mikado locomotives. The former order is not to be delivered until January and February, 1918, and the latter order until November, 1917. The same builder will also furnish 9 locomotives of various types for the Maine Central. The Baldwin Locomotive Works will furnish the St. Louis & San Francisco with 30 Santa Fes and the Chicago, Burlington & Quincy with 35 Mikados and 10 Santa Fes. The Russian Government has increased its order of 331 Decapod locomotives to 350 by ordering 10 more from the Baldwin Locomotive Works and 9 from the Canadian Locomotive Company. The British Government is reported to have ordered 40 locomotives from the Canadian Locomotive Company and it is also stated that the same company will furnish the Canadian Ministry of Munitions with 40 consolidated locomotives, 83 tons each. It is also stated that the William, Dederich Company of London has ordered 24 light locomotives from the H. K. Porter Company of Pittsburgh. Recent inquiries amount to 39, the principal one being 25 for the Texas & Pacific. It is estimated that for the period ending with Dec. 23 total orders placed amounted to 657, of which 304 were for export. This total already exceeds that of November for 586 and is fast approaching the largest month of the year, which was October with 779. The December orders so far reported bring the total for the last half of this year to 2514, which, added to the 2124 for the first half of the year, make the total ordered to Dec. 23 inclusive 4638. This compares with 1972 in all of 1915.

### Coating Basic Furnace Linings with Enriched Slags

Coating the bottom and sides of the basic lining of an open-hearth furnace with an enriched and thickened slag is the subject of a patent (U. S. 1,198,827—Sept. 19, 1916) taken out by Alfred E. Davies of Bilston, England, as a modification of the manufacture of steel by the basic open-hearth process. After the charge has been worked in the usual way until the bulk of the silicon and phosphorus has been removed the slag is tapped off by tilting the furnace, and further additions of lime, iron ore, and oxides are made in order to remove the last traces of impurities, thus forming in the second part of the process the rich slag which it is intended to retain in the furnace as a coating to the lining. The metal is tapped off when finished without allowing the slag to run out, and the slag is further enriched and thickened by lime and metallic oxide additions and the furnace repeatedly tilted so as to make the slag adhere to the bottom and sides, ready for the next charge of molten pig iron. When this is poured in a reaction begins which removes the bulk of the impurities, quickly bringing the process to the point where it started.

### Investigation of Clay Refractories

One of the most elaborate investigations ever undertaken, dealing with tests of the finished clay refractories of the United States, has been started by the United States Bureau of Standards, in co-operation with the American Refractories Manufacturers' Association and the American Gas Institute. It is proposed to make this work the basis of a system of classification and specifications governing the several classes of fire-clay refractories. The bureau also has begun work on another investigation dealing with a phase of the same industry, using a dolomite in certain metallurgical furnaces as a refractory. Usually the burnt dolomite is placed directly in position in the furnace with tar or some other combustible material as a binder. When the lining was of such a nature that it had to be made of brick, magnesite brick was used, but the price of

this has made it prohibitive. The bureau hopes to determine whether the dolomite might be burned in such a manner, or with the addition of such impurities, that the lime present would not slake, except after an extended period, making it possible to produce brick of this material which would replace magnesite brick.

### Harris Engineering Company's Operations

After two years in the machinery manufacturing field, the H. E. Harris Engineering Company has found it necessary to triple the capacity of its present plant at 1041-1055 Broad Street and 116-118 John Street, Bridgeport, Conn. Much machinery has been purchased to equip the new plant which will be in operation by June, 1917. This machinery is principally used in making tools, but the company also manufactures a large variety of such products as tapping machines, automatic hub-grinding machines, notching machines for rifle sights, testing machines, taps, dies, cutting tools, jigs, fixtures, gages and punches. The company also acts as consulting engineer to manufacturers. Harry E. Harris, president, was formerly in charge of the mechanical department of the Western Electric Company's New York plant and has been superintendent and consulting engineer of the Greenfield Stamp & Die Corporation. Frank G. Hubbard, vice-president, was superintendent of the Hawthorne, Ill., plant of the same company. John Gelzenlichter, who has had 23 years' experience with manufacturing concerns, has been engaged as superintendent.

### Increasing the French Steel Output

The French Minister of Public Works, the Under-Secretary of State and other officials recently attended an important conference at Caen, at which Director Schneider of the Creusot Works, leading public men and representatives of the Chamber of Commerce and of industry, were present. The minister told of the steps the Government had taken to open the iron mines now idle, and to start prospecting for coal immediately in the Litry district. For the latter purpose the government has asked a vote of \$400,000. The railroad lines to Caen are to be improved, and the harbor deepened to accommodate vessels of 8000 tons. It was also stated that the coke ovens at the blast furnaces of Caen would be started at once, and that near the works producing raw materials plants for making guns and ammunition would also be established in the district.

### New Heroult Furnace

The United States Steel Corporation has granted a license to the Milbury Steel Foundry Company, Milbury, Mass., for a 2-ton electric steel furnace. This will be used to make steel castings from cold scrap. The company at present is operating a crucible steel foundry. This installation brings the total furnaces of this type in operation or contracted for in the United States and Canada to 83.

The new 20-ton Heroult electric furnace at the plant of the Carnegie Steel Company, Duquesne, Pa., was successfully started about the middle of November and has been producing steel ever since from hot metal from the open-hearth department.

### Rennerfelt Electric Furnaces

Two Rennerfelt electric steel furnaces have recently been successfully started. The 3-ton furnace at the plant of the American Foundry & Machine Company, Salt Lake City, Utah, is operating on a basic bottom, making steel ingots for the Utah Iron & Steel Company at Midvale, Utah.

The 1-ton furnace at the Samson Iron Works, Stockton, Cal., is operating on a basic bottom, making steel castings, and has made over 50 heats.

The Central Steel Company, Massillon, Ohio, has started the erection of two additional 75-ton open-hearth furnaces. On their completion the company will have seven open-hearth furnaces of that capacity.

## PERSONAL

The retirement of James Lord, president of the American Iron & Steel Mfg. Company, Lebanon, Pa., following the acquisition of that company by the Bethlehem Steel Company,



concludes 45 years of continuous activity in the iron and steel manufacturing business. After 10 years' connection with the Reading Bolt & Nut Works he was appointed general manager of the Pennsylvania Bolt & Nut Company, in which capacity he served for 17 years. In 1899 he became general manager of the American Iron & Steel Mfg. Company, which was then formed to take over the Pennsylvania and several other bolt, nut and rivet plants. For the past 10 years he has acted as president

of the company, and authority which it is stated will be taken over by officials of the Bethlehem Steel Corporation.

John Penn Brock, who has been vice-president of the American Iron & Steel Mfg. Company, in charge of the operating departments both at Lebanon and Reading, will continue as superintendent of these plants for the Bethlehem Steel Corporation.

Francis D. Dutton, superintendent of the two Lebanon furnaces acquired some months ago by the Bethlehem Steel Company, will also assume charge of its new furnace interests at Lebanon, just purchased from the Lackawanna Iron & Steel Company.

R. A. Bull, who recently resigned as manager of production for the Commonwealth Steel Company, will become vice-president and general manager of the Chicago Steel Foundry in which he has also acquired an interest. The change becomes effective Feb. 1. Mr. Bull is a past president of the American Foundrymen's Association.

Charles H. Caler, Rochester, Pa., has been appointed deputy factory inspector, specializing in foundry work, succeeding J. R. Patterson, Beaver Falls, resigned.

M. R. Maclean, who has been with the American Steel Foundries nearly 10 years, has resigned and will spend the remainder of the winter in the South before establishing new connections. He was general sales agent located at Pittsburgh.

Sylvanus L. Schoonmaker, chairman of the board of directors of the American Locomotive Company, announces that W. M. Marshall, president of the company, has resigned as president and director, to take effect Dec. 31; that J. McNaughton, vice-president, has also resigned, his resignation to take effect Feb. 1, that these resignations have been accepted, and that Charles Hayden of the firm of Hayden, Stone & Co., has been elected a director to fill the vacancy in the board. On Tuesday, Dec. 26, the directors elected Andrew Fletcher president. He is president of the W. & A. Fletcher Company, manufacturer of marine engines, Hoboken, N. J., a director of the William Cramp & Sons Ship & Engine Building Company, president of the Consolidated Iron Works and the North River Derrick Company, and a director of the Hoboken Trust Company and the First National Bank of Hoboken.

At a meeting of the board of directors of J. G. White & Co., Inc., New York, R. B. Marchant, treasurer of the corporation, was elected to the office of vice-president.

E. S. Christiansen has been appointed manager of the Detroit office of the United Smelting & Aluminum Company, Inc., New Haven, Conn., effective Jan. 1, and W. T. Schmitt has been appointed assistant manager to take effect at once. Mr. Christiansen was purchas-

ing agent of the Haydenville Company, Haydenville, Mass., for a number of years and Mr. Schmitt was formerly with the Bosch Magneto Company, Springfield, Mass. The Detroit office of the company is now located in the Dime Bank Building.

H. L. Lautenschleger, chief of the materials follow-up department of the Westinghouse Electric & Mfg. Company, East Pittsburgh, Pa., now decides the purchase of castings for the company. He was recently elected secretary of the Veteran Employees Association, composed of men who have been in the service of the company 20 years or longer.

K. C. Li, Shanghai, China, president of the Hunan Government Lead Smelting Works, has been in San Francisco recently to purchase machinery and supplies.

George W. Knopf, for the last nine years assistant manager of the McClintic-Marshall Company's plant at Pottstown, Pa., has resigned. Except for a period of two years, when he was with the American Bridge Company at its New York offices, Mr. Knopf has since 1900 been connected with the McClintic-Marshall Company. F. T. Cadmus succeeds him.

John I. Reid has been made superintendent of the Longue Pointe plant of the Canadian Steel Foundries, Ltd., Montreal, Canada. He assumes his duties at once. He was formerly works manager of the American Steel Foundries' plant at Chester, Pa., and recently sales agent for the company at 30 Church Street, New York City.

## OBITUARY

WILLIAM E. LEARD, of New Brighton, Pa., died at Southern Pines, N. C., Dec. 17, following a long illness, aged 74 years. He was born at Livermore, Pa., and served through the Civil War in a Pennsylvania regiment. Shortly after the war he engaged in the manufacture of drill presses in Cincinnati. In 1882 he established a plant in New Brighton, Pa., for the manufacture of connecting rods, strap joints, crankshafts and machine keys, and was in active charge of the business until about eight years ago. He leaves one son and two daughters.

WILLIAM SCHLEMMER, majority stockholder of Hammacher, Schlemmer & Co., large hardware merchants at 133 Fourth Avenue, New York, died Dec. 23, at his home in that city, after a short illness, aged 76 years. He was born in Germany, and came to this country in 1853. He became a messenger boy and clerk for the house with which he was connected 63 years. He was treasurer of the company. His only son, William F. Schlemmer, is president.

HENRY BINNS, head of the Binns Iron Foundry, Passaic, N. J., died Dec. 17, aged 77 years. Coming from England, he was connected for a long time with the Watts-Campbell Company, manufacturer of steam engines, Newark, and established the foundry which bears his name 30 years ago. While working in England, he is reputed to have taken an important part in making the first piece of armor plate used by the British navy.

THOMAS H. MARTIN, president American Shovel & Stamping Company, South Lorain, Ohio, died Dec. 10. He had been connected with the company since it was established 17 years ago.

ROBERT MAIN, mill superintendent, who was formerly connected with the Commonwealth Steel Company's plant at Granite City, Ill., died recently at Welland, Ont.

Manganese ore imports to the United States in October were 26,078 gross tons, the lowest amount for any month this year since March, which had 26,212 tons. The September total was 73,536 tons. The total for the 10 months to Nov. 1, 1916, was 495,300 tons, or 49,530 tons per month, against 20,087 tons, and 25,511 tons per month to Nov. 1, 1915 and 1914, respectively. The imports in the first three months of this year were only 51,545 tons.



## Brass Manufacturers' Annual Meeting

Uniform methods in the conduct of business were adopted at the thirtieth annual meeting of the National Association of Brass Manufacturers, held at the Hotel Astor, New York City, Dec. 14. After Jan. 1 a uniform acceptance order blank will be used, making all orders of any magnitude a contract and not subject to cancellation. Goods will be shipped only at earliest convenience and at prices existing on the date of shipment. These measures were adopted, according to William M. Webster, commissioner for the association, because of conditions in the raw material market and the pressure of business. Purveyors of raw material were unable to make prompt deliveries or guarantee prices, he said, and, consequently, the manufacturers were compelled to protect themselves in a similar manner.

Several lines of products have been standardized. A resolution was passed, to become effective Jan. 1, that jewel cup tubes would be eliminated entirely from bath cocks and that sizes and threads would be made according to a uniform standard in order that all parts will interchange. Committees to report on further means of establishing uniform methods and products are as follows:

Standardizing Staple Goods and Fixtures: E. F. Niedecker, Hoffman & Billings Mfg. Company, Milwaukee; M. J. Koblitz, J. A. Cochran Brass Mfg. Company, Cleveland, Ohio; C. S. Johnson, Northern Brass Mfg. Company, Waukegan, Ill.; A. I. Fischer, Glauber Brass Mfg. Company, Cleveland.

Uniform Cost System: Adolph Mueller, H. Mueller Mfg. Company, Decatur, Ill.; G. C. Hall, McRae & Roberts Company, Detroit; H. N. Gillette, Standard Sanitary Mfg. Company, Pittsburgh.

The association became affiliated with the Chamber of Commerce of the United States of America and appointed Adolph Mueller councillor and C. C. Hale, Peck Bros. & Co., New Haven, Conn., his alternate. Many members favored an affiliation with the National Industrial Conference Board, but no formal action was taken.

The election of officers resulted as follows: President, C. H. Downs, E. Stebbins Mfg. Company, Springfield, Mass.; first vice-president, Harold W. Wolff, L. Wolff Mfg. Company, Chicago; second vice-president, E. Rickersburg, Rickersburg Brass Company, Cleveland. The trustees are L. D. Lawnin, Edwardsville Brass Company, Edwardsville, Ill.; H. N. Speakman, Speakman Supply & Pipe Company, Wilmington, Del.; W. H. Wasweyler, Milwaukee Brass Mfg. Company, Milwaukee; A. I. Fischer, Glauber Brass Mfg. Company, Cleveland; H. N. Gillette, Standard Sanitary Mfg. Company, Pittsburgh; Adolph Mueller, H. Mueller Mfg. Company, Decatur, Ill.

Sixty manufacturers attended the convention, which was addressed by Prof. L. S. Wright and Francis J. Torrence. The next session will be held in Chicago March 21 and 22, 1917.

## Registration of All British Firms

The British Registration of Business Names bill affects not only present enemy firms and persons, but every firm or person, British or foreign, having a place of business in the United Kingdom and carrying on business under a name which does not consist of the true surnames of all partners. All these firms and persons must register under pain of a fine of £5 for every day's default, and anybody may start proceedings against them. Besides, courts of law are not to enforce contracts entered into by firms or persons which omit to register, during the time they are in default, unless the court sees fit to give them relief. In addition to this, every registered firm must put the registered particulars in every catalog, circular, or business letter it sends out.

Warren Webster & Co., Camden, N. J., have disposed of their air conditioning department, and on and after Jan. 1 the Webster air conditioning apparatus will be manufactured and exploited by the Braemer Air Conditioning Corporation, Lafayette Building, Philadelphia.

## TRIBUTE TO C. M. SCHWAB

### Significant Statements Concerning Bethlehem Steel Company Policies

The tributes paid to Charles M. Schwab at a dinner given in his honor at the Lotus Club, New York, Dec. 21, and some of the statements made by Mr. Schwab in a carefully prepared speech made this a signal occasion among many at which he has been the chief figure. Referring to the Bethlehem Steel Company and its status since the acquisition of the Pennsylvania Steel Company properties, Mr. Schwab said:

Though Bethlehem has prospered, the fact about Bethlehem in which I most keenly rejoice is that, whereas in 1915 we employed 23,000 men, in 1916 some 70,000 men are on our payrolls. In 1915 our total payroll was \$22,500,000; in 1916 it is at the rate of \$72,000,000 a year, or \$6,000,000 a month. The average earnings of each wage-earner in our employ were a little over \$900 per man in 1915, whereas our figures for 1916 show average earnings of nearly \$1,200 per man, an increase of more than 30 per cent.

We at Bethlehem have felt great satisfaction during the last two and a half years at our affairs having been placed upon such a basis that in spite of the great increases in the costs of all materials we were able to supply all ordnance products to the United States Government at exactly the prices prevailing before the war in Europe began. We have felt that this was something worth doing for its own sake.

At the present time our navy is being rebuilt and enlarged. Greater ships are to be constructed and larger guns will be used than ever before in the history of the country. Realizing the need we have already undertaken, out of the profits derived from other business, to construct at a cost of \$4,500,000 a plant fitted to build 16-in. guns, the plant to be of use for no other purpose. We have received no assurances from the Navy Department, and under no conceivable conditions can the orders which we may receive for this plant pay a fair return on the investment. But we felt that we must do this to play our part in protecting the nation.

Referring to trade conditions after the war, Mr. Schwab said that there will of necessity be a reduction in the demand for munition steel and some recession in steel prices would be seen. "But the domestic demands for steel rails, for building, and for numerous other purposes await only a more normal condition of trade to press forward for prompt satisfaction. Those domestic demands alone will absorb our steel capacity for many years. A period of depression will come some time, and it may be severe, but it will not become acute, in my judgment, until at least three to five years after the war is ended."

Another speaker was President E. G. Grace of the Bethlehem Steel Company, who told of the offer made to Mr. Schwab last year to sell his stock in the Bethlehem Steel Company at \$600 a share and thus pass the control of the company to others. Though this would have meant \$50,000,000 to him he refused to sell a share.

When Mr. Schwab came to Bethlehem the town had 13,000 inhabitants. To-day the employees of Bethlehem Steel alone are sufficient to make a city of 150,000 people. Ten years ago the annual sales of Bethlehem were \$10,000,000. Last year they were \$230,000,000.

During many of the years in which he worked hardest for the company—years, in some of which the company could not borrow money unless Mr. Schwab personally indorsed its paper—he declined to accept any salary. Mr. Schwab, though himself the largest shareholder, for ten years or more kept pouring the earnings back into the property, denying himself any return on the large investment he had made. It is for such reasons as these that the phenomenal action of Bethlehem in the stock market was not merely pyrotechnics; it was only belated reflection of the meaning of a policy of men-building and of property-building as magnificent as anything in the history of American industry.

## Australia Prohibits Tin-Plate Imports

The Australian Government has prohibited the importation of tin plate from the United States, according to a cablegram from U. S. Commercial Attaché Phillip B. Kennedy, Melbourne, dated Dec. 8, 1916. The order does not apply to shipments actually en route.

## Wage Advances and Bonuses

The Pennsylvania Engineering Works, New Castle, Pa., has announced an increase of 10 per cent in wages of its employees from Jan. 1, affecting about 450 men.

The American Manganese Mfg. Company, operating two blast furnaces at Dunbar, Pa., has announced an increase in wages of outside employees of 10 cents a day, and of inside men, including the clerical forces, of 10 per cent.

The Ohio Iron & Steel Company, operating Mary furnace at Lowellville, Ohio, gave its employees a bonus of 10 per cent of their gross earnings for the year 1916.

Notices have been posted at several shops in the Youngstown district, notifying the molders and machinists of a voluntary wage advance, to take effect Jan. 1, but the exact amount of the increase has not yet been stated. Some time ago the molders in the district received a voluntary advance in wages considerably above the established wage scale that does not expire until next June, and the foundry owners, desiring to be absolutely fair with their employees, so as to permit them to meet the higher cost of living, will give another voluntary advance. The machinists will secure an increase in wages in consideration of their calling off the long strike, which lasted from May until November, and also because of the higher cost of living.

Life-insurance policies and profit-sharing premiums to the approximate value of \$1,000,000, as reported, were distributed Dec. 23 to 900 employees of the Sperry Gyroscope Company, Brooklyn, N. Y., manufacturer of gyrocompasses, ship stabilizers and high-intensity searchlights. The profit-sharing premiums cover a period from Oct. 1 to Dec. 31, but will be continued in the future, the individual amounts depending upon the length of employment, but including all employees whether they had been with the company five years or only three months. The group life-insurance policies issued by the Travelers' Life Insurance Company are for each individual employee's last annual earnings, and include disability benefits.

President John Sargeant of the Domhoff & Joyce Company, Cincinnati, distributed a holiday bonus to each employee of the company of 10 per cent of the salary paid each one in 1916.

The Crane Company will pay its 12,000 employees in the Chicago and Bridgeport plants and branch houses a 10 per cent bonus. The total amount paid will be approximately \$1,000,000.

The Commonwealth Steel Company, St. Louis, Mo., with plant at Granite City, Ill., in announcing last week an increase of 10 per cent in wages, affecting more than 2500 men, also stated that the company store operated at Granite City will henceforth be conducted without profit. The wholesale prices will be given to both cash and credit accounts, but only workmen at the plant will be permitted to make purchases.

For the past seven years the employees of Cleveland Crane & Engineering Company, Wickliffe, Ohio, have been given a bonus at the end of the year representing their share of the profits distributed for faithful service. Under this system 3000 hours have been taken as a year's work, and to each employee who has not been absent from work more than one day each month during the year one per cent of his yearly wages has been paid for each full year that he has been in the employ of the company. The employees were made doubly happy this year by the announcement by C. C. Robbins, general manager of the company, that because of the increase in the business of 1916 the bonus will be increased 100 per cent, the employees eligible receiving 2 per cent of their yearly wages for each full year they have been with the company. A number of the old employees will receive checks amounting to 20 per cent of their wages for this year. The majority of the company's employees will benefit this year under the system.

Every steel shipbuilding yard in Portland, Ore., now operating on the open-shop basis, is threatened with a strike for the closed shop. B. C. Ball, president Willamette Iron & Steel Works, announces that his plant will be closed down if a strike materializes, and

will remain closed until the force can be reorganized and the plant operated open shop. The unions have presented the various companies with an agreement, which they ask be placed in effect Jan. 1, insuring an 8-hr. day, closed shop, and a material advance in wages.

The directors of the Republic Iron & Steel Company have adopted a merit system of compensation, and a portion of the surplus earnings will be set aside for profit-sharing distribution, by which 6000 employees in Youngstown, Ohio, will be benefited. It is said only 7 per cent of the company's output consists of war orders.

## Starrett Company Bonus to Employees

Employees of the L. S. Starrett Company, Athol, Mass., have been voted a bonus by the directors to be distributed as soon after Jan. 1 as practicable. The amount in each case will be a percentage of the wages paid the employee during this year. This percentage depends on the term of continuous employment with the company, as follows: One year or less, 2 per cent; one to three years, 3 per cent; three to five years, 4 per cent; five years or more, 5 per cent. This is the fourth year in which the Starrett Company has made such a distribution. The amount on the other occasions was 2 per cent of the year's wages. It will be more this time. In making the present announcement the company calls attention to the fact that the quality of production must be in the mind of all as the best security for business success and for steady employment.

The officials of the Lukens Iron & Steel Company, Coatesville, Pa., now expending about \$3,000,000 in plant additions and extensions, will apply to the Pennsylvania authorities Jan. 16 for a charter for a new company to be known as the Lukens Steel Company. The plan is to recapitalize the business of the Lukens Iron & Steel Company on a basis of the present value of the plant and to take in some outside capital. A. F. Huston, president; Charles L. Huston, vice-president and general manager, and Joseph Humpton, secretary and treasurer, will retain control. In the formal notice of application for a charter for the new company William S. Evans, Frank H. Gordon, Graham Roberts and Gustave T. Schnatz are mentioned as the incorporators. Mr. Gordon is at present general sales agent of the company while the others are members of the sales force.

Announcement has been officially made that the Pullman Company will establish a plant at St. Louis, Mo., second only to that at Pullman, Ill., which will employ about 3000 men and will cost about \$5,000,000. A Pullman settlement will be established in the vicinity of the shops and accommodations provided for a community of 10,000 to 12,000 persons. Options have been closed on an acreage tract in the northwestern part of the city and construction work will begin in a short time. In addition to building new passenger cars, it contemplates the largest repair plant of the company's ownership. The total area acquired under option is 64 acres.

The Whitaker-Glessner Company, Wheeling, W. Va., will build eight hot-sheet mills and the necessary cold mills at Beach Bottom, near Wheeling. The contract for the buildings, taking about 1500 tons of steel, has been placed with the McClintic-Marshall Company; for the foundations, to the Foundation Company; for the hot and cold mills and other equipment, with the Wheeling Mold & Foundry Company; and for the electrical equipment, with the Westinghouse Electric & Mfg. Company. Work will start at once, and it is hoped to have the mills ready for use before next autumn.

J. Coughlan & Sons, Vancouver, B. C., have taken contracts for three 8800-ton steel vessels, for delivery in the next 12 or 15 months. The measurements of these boats are as follows: Length, 423 ft., 9 in.; beam, 54 ft.; and depth, molded, 29 ft., 9 in. The speed of the vessels when loaded will be 10½ knots.



### Contracts for Ford Blast-Furnace Plant

In connection with the litigation over the proposed blast-furnace plant of the Ford Motor Company, Detroit, an affidavit has been made by William B. Mayo, chief construction engineer of the company, which sets forth the following as the status of contract obligations to various equipment and supply companies:

To the Riter-Conley Company of Pittsburgh for fabrication and erection of steel for blast furnaces, at least \$900,000. This contract was signed Oct. 31, 1916, and the Riter-Conley Company has ordered its tonnage, made its specifications, and the steel is being fabricated.

To Julian Kennedy, chief engineer, at least \$150,000, payable at the rate of \$6,000 a month, beginning Sept. 1, 1916. This contract was signed Sept. 2, 1916, and payments have been made regularly.

To the Pere Marquette Railroad for constructing sidings from its main line, \$9,500. This work has been practically all done.

To the Michigan Central Railroad for constructing sidings from its main line, about \$18,000. This work was practically done during the last two months.

Money paid to the Detroit Marine Construction Company for test piles, amounting to something over \$1,300.

Considerable sums advanced for traveling expenses and engineers and other employees of the Ford Motor Company, conducting investigations and experiments for more than a year and a half.

Obligations to Wellman-Seaver-Morgan Company, amounting to approximately \$252,000 for ore unloaders. This contract was closed by letters Oct. 26. The formal contracts are now ready to be signed. The Wellman-Seaver-Morgan Company has already placed its orders for materials.

Verbal orders for ore bridges to Mead, Morrison & Co. of Chicago, amounting to approximately \$152,000. The Chicago concern placed its own orders for materials some time before the suit was begun. The formal contracts are ready for signature.

Verbal agreement with Hoover & Mason of Chicago for ore bins or pockets, amounting to approximately \$350,000. The company's orders for materials have been placed and the work is now going on.

Verbal orders for firebrick or linings, amounting to approximately \$200,000, to Harbison-Walker Refractories Company, Pittsburgh, \$75,000; Niles Fire Brick Company, Niles, Ohio, \$75,000, and Steere Engineering Company, Detroit, \$50,000. The contracts with the first and third named concerns are in Mr. Mayo's office for signing.

Mr. Mayo declares besides that several of these obligations are legally binding and that all are morally binding. Several of the companies involved join him in stating that the damage will be irreparable both to themselves and the Ford Motor Company if their work is halted at this time.

The plans of the Ford company for the new plant on River Rouge involve an expenditure of more than \$3,000,000.

### Chain-Selling Arrangements Changed

Hendricks & Class, 30 Church Street, New York, have closed arrangements to represent the Columbus Chain Company in the metropolitan district, together with New Jersey, Long Island, New England, Philadelphia and vicinity, and also caring for the company's export business. The Columbus Chain Company has plants at Columbus, Ohio, and Lebanon, Pa., manufacturing stud-link, dredge, steam-shovel and hoisting chains, saddlery hardware and all kinds of wagon chains.

Hendricks & Class have continuously represented the Standard Chain Company for 17 years. Their new connection is made for the reason that the Standard Chain Company was sold recently to the American Chain Company, Bridgeport, Conn., and the latter company, which has factories at Mansfield and St. Marys, Ohio, and Marion, Ind., will sell through its own organization.

The Antimony & Compounds Company of America, Pissataway, N. J., has been incorporated with a capital stock of \$200,000, to operate a smelting and refining plant for antimony and kindred products. Joseph Dhavermas, Eric Goodwin and Robert L. Hoguet are the incorporators.

### Interstate Iron & Steel Company Acquires Grand Crossing Tack Company

The Interstate Iron & Steel Company, Chicago, has acquired all of the business and property of the Grand Crossing Tack Company, Chicago, and the combined businesses will be continued as the Interstate Iron & Steel Company. Silas J. Llewellyn continues as president; Samuel Hale, formerly with the Wisconsin Steel Company and later general manager of the Algoma Steel Company, becomes vice-president in charge of the steel plant operations, and George F. Davis is secretary and treasurer.

The Interstate Iron & Steel Company was organized in 1905, with assets of about \$250,000, and began business with the purchase of a merchant bar mill at East Chicago, Ind. In 1915 a hard steel bar rolling mill was erected at Marion, Ohio, with an approximate capacity of 48,000 tons annually. At the present time the net worth of the company is about \$2,000,000, the increase from the original assets being entirely from profits. A further expansion of the East Chicago plant was planned in 1916 to provide for an open-hearth steel plant. This extension is now to be carried out at the steel plant of the Grand Crossing Tack Company just acquired.

The Grand Crossing Tack Company was organized in 1883 with a capital of about \$10,000 and at present has assets approximating \$4,000,000. The properties include an open-hearth plant of two 40-ton furnaces built in 1902-3, to which two are now to be added (expected to be finished in April), a blooming mill, a wire mill and finishing plant. The products are ingots, billets, wire rods, barbed wire, woven wire fence, wire nails, rivets, staples and tacks. With the two additional open-hearth furnaces the steel plant will have capacity of 135,000 tons per year. The combined capacity of all of the plants of the Interstate Iron & Steel Company will now approximate 300,000 tons per year. The newly acquired steel plant is at 118th Street, South Chicago, and the wire rod and wire finishing mills are at Grand Crossing, Ill.

O. N. Hutchinson was president, treasurer and general manager of the Grand Crossing Tack Company and E. W. Hutchinson secretary and general sales manager. The company was incorporated in 1908.

### Wagner Electric Mfg. Company Changes

The Wagner Electric Mfg. Company, St. Louis, incident to its expansion, will remove its branch offices as follows: The Chicago office to 918 South Michigan Avenue, the Boston office to 88 Brookline Avenue, the San Francisco office to 159 New Montgomery Street. Each will combine with the company's local service station.

P. B. Postelthwaite, formerly manager of the Cincinnati office, is now in charge of the service department with headquarters at St. Louis; J. W. Bryant, formerly in charge of the Buffalo and Syracuse offices, is now Cincinnati manager; C. P. McDonigal, of the Philadelphia office, will be in charge of the Syracuse and Buffalo offices; the Los Angeles office will be augmented by the services of H. W. Doubrava, for many years with the New York office; the St. Louis service station is now under the direction of C. M. McCord, and the sales force of the home office has been augmented by E. V. Potter, E. Holstrum and O. J. Miller.

The Himoff Machine Company, Inc., and the Acme Gear Works, Inc., have removed their main offices and plant to 45 Mills Street, Astoria, Long Island, N. Y., adjacent to the Ninety-second Street ferry. The factory and equipment will be ready for inspection after Jan. 30. These companies make gear hobbers, turret lathes, heavy duty lathes, gears and tobacco-cutting machines. The sales office is located at 50 Church Street, New York.

# Machinery Markets and News of the Works

## LARGE RAILROAD LIST OUT

### Great Northern to Purchase 289 Tools

Little Slackening to Buying—Embargoes and Car Shortages Growing Difficulties—The Bethlehem Steel Company Buying Cranes

One of the largest lists ever put out by a railroad has been issued by the Great Northern Railway Company, St. Paul, Minn. It covers every kind of shop equipment and is for a total of two hundred and eighty-nine tools. With the several railroad car and repair shop plants now being undertaken in the central and south west, it is not improbable that other lists may follow this one.

In all centers the machine-tool business shows a slight tapering off, although it is a lot better than it usually is at this time of the year. Delayed deliveries and price advances have not kept buyers off as much as might have been expected. The reports show that everywhere plans are taking into account the probable continuance of the present activity in the manufacturing field.

Export houses, also, expect their present large sales in Europe to keep up, whether peace comes early or late. It has been holding well, and was particularly strong following Germany's peace proposal.

As in other lines, the problem of deliveries becomes daily more and more troublesome, as embargoes and car shortages hold up shipments both incoming and outgoing. In New York embargoes are stopping shipments from the Middle West. At Milwaukee the situation is so bad that it is curtailing production, warehouses are filled, and no way is open to move the finished equipment.

The Bethlehem Steel Company has ordered some heavy-duty cranes for its gun-making plants, and it is believed will close shortly for 15 or more for its Sparrows Point plant.

## New York

NEW YORK, Dec. 27, 1916.

General activity shows a slight tapering off, but it is still far better than is usual at this season. With so many orders on their books sellers of machine tools are more concerned with getting deliveries through than in writing new business. The volume of shipments from the tool-building companies does not increase to a satisfactory extent, and deliveries are hampered also by the embargoes on shipments from the West, which affects domestic as well as export deliveries.

That deliveries are far advanced in lines other than machine tools is indicated by the situation which exists with a maker of pumps and condensers whose best delivery is 18 months and which has machinery under contract for delivery 2½ years from now.

Single-tool orders continue to hold sway, although some fairly large lots have been purchased. The General Electric Company is buying tools for the Sprague Electric Company works at Bloomfield, N. J. Several machines, including a boring mill and an open-side planing machine, are to be bought by the De Laval Steam Turbine Company, Trenton, N. J.

The Long Island Railroad is expected to issue a small list after January 1.

The Bethlehem Steel Company has placed orders for 10, 40, 100 and 250 ton cranes for South Bethlehem, the largest one being for handling the giant guns to be built for the United States Government. The Bethlehem Steel Company is also expected to close within a few days for 15 or 18 cranes for its Maryland Steel Company plant at Sparrows Point, Md.

An export sale amounting to \$20,000 was made by a dealer in the week, although with the dealers the recent export business has not been heavy. Large exporting companies say that the foreign demand is holding up well and was particularly strong in the week following Germany's peace announcement. One exporting company sold more tools abroad in that week than in the preceding month. Regardless of whether or not peace comes early exporters are confident of a continuance of buying activity in Europe. Refitting the arsenals will need a great amount of equipment, to say nothing of upbuilding the industries.

The Wright-Martin Aircraft Corporation, 60 Broadway, New York, has acquired all the capital stock of the Wright Company, the Glenn L. Martin Company, the Simplex Automobile Company, the Wright Flying Field, Inc., and the General Aeronautic Company of America, in accordance with its plans of last summer. At the Simplex plant at New Brunswick, N. J., it has erected an aluminum and iron foundry, increasing its capacity tenfold for the production of automobile and aeroplane motors. It is now equipped to manufacture at the rate of 3000 aeroplane motors per year and also 500 of the large Simplex cars and 800 small town-cars, and with the completion of its Eastern aeroplane factory, will be in a position to manufacture 700 complete aeroplanes a year. In connection with this development, the Simplex Automobile Company has increased its capital stock from \$5,000,000 to \$9,000,000.

The following increases in capital stock have recently been reported by the Secretary of State, Albany, N. Y.: The Albany Car Wheel Company, Albany, \$100,000 to \$300,000; the Himoff Machine Company, 45 Mill Street, Astoria, Long Island, N. Y., \$20,000 to \$100,000; the Ericsson Screw Machine Products Company, 607 Bergen Street, Brooklyn, \$15,000 to \$50,000; the Motor Car Equipment Company, 19 West Sixty-second Street, New York, \$150,000 to \$550,000; the Hunter Arms Company, Fulton, \$150,000 to \$750,000; the Bell Locomotive Works, 30 Church Street, New York, \$20,000 to \$50,000; the Kay Mfg. Company, 20 Morton Street, Brooklyn, maker of furniture springs, \$30,000 to \$50,000; the Higley Machine Company, Croton Falls, N. Y., \$25,000 to \$50,000; the Thomas Brothers Aeroplane Company, Ithaca, N. Y., \$100,000 to \$200,000 and the Bronze Products Society, 456 Fourth Avenue, New York, \$1,000 to \$75,000.

The H. W. Johns-Manville Company, Madison Avenue and Forty-first Street, New York, has decided not to erect a plant at New Rochelle, N. Y. It had this plan recently under consideration.

The Birdsall Engine Company, Auburn, N. Y., manufacturer of engines, saw mills and threshing machinery, has purchased the former Haywood factory at Newark, N. Y., consisting of a one-story building, 100 by 565 ft., with 8 acres of land. The company intends to install its own foundry later on. Emery Caldwell is president.

The Herschell-Spillman Company, North Tonawanda, N. Y., manufacturer of gasoline motors, has increased its capital stock from \$250,000 to \$750,000. The company will pay a 100 per cent stock dividend Dec. 30 and in addition a regular quarterly cash dividend of 2 per cent. The balance of the increased capital will be used to enlarge its present facilities. The company has just completed the construction of a four-story addition, 65 x 165 ft., for handling increased business. Guy White is vice-president and general manager.

The Kellogg Mfg. Company, Rochester, N. Y., manufacturer of air pumps and automobile accessories, has increased its capital from \$25,000 to \$75,000. It plans to erect a new building, 50 x 100 ft., three stories, as well as a new heating plant. The offices will be re-established on the third floor. The company has purchased machinery to equip its new building.

Heughes & Co., Inc., Rochester, N. Y., is in the market for a 3 x 3 in. angle bevel shear and for shears for cutting rounds and squares up to 1 in. capacity.

Maier & Flockhart are enlarging and making extensive repairs to their jobbing foundry on Polk Street, Newark, N. J. One building is being razed and will be replaced at a cost



of from \$10,000 to \$15,000. The entire plant of the Tabor Sash Company on a lot of 100 ft. square, facing Polk Street, has been purchased by Maher & Flockhart. The use to which this will be put has not been determined.

The extensions to be made at the plant of the Charles Burroughs Company, 141 Commerce Street, Newark, N. J., manufacturer of hydraulic pumps and presses, will consist of a two-story machine shop and office, 75 x 88 ft., to cost about \$18,000.

The American Synthetic Dyes, Inc., Newark, N. J., will build three one-story boiler-house additions to its plant on meadows, to be used for auxiliary service. An absorption tower for fumes will also be erected at an estimated cost of \$18,000.

George F. Fischer, Newark, N. J., has had plans for an addition to his commercial garage and repair shop at 596 South Eleventh Street, 52 x 138 ft., with provision for a machine shop to handle different classes of work. The estimated cost is \$11,000.

Igoe Brothers, Newark, N. J., manufacturers of wire and wire nails, have filed plans for an addition, 50 x 98 ft., at Avenue A and Poinier Street, estimated to cost \$3,500.

The Union Smelting & Refining Company, New York, has purchased a tract of land on St. Charles Street, Newark, N. J., fronting on the Pennsylvania and Lehigh Valley railroads, and will build a plant for the production of tin, lead and other metals.

The Campbell Lamp Company, Jersey City, N. J., has been incorporated with a capital stock of \$100,000 to manufacture gas and electric lamps, fixtures, etc. Charles A. Campbell and Henry W. Van Alen, Brooklyn, N. Y., and E. C. Abell, New York, are the incorporators.

The Grymes Engineering Company, Jersey City, N. J., operating a marine repair plant at the foot of Morris Street, has abandoned its proposed new repair and construction plant in the South Cove section, due to difficulties in acquiring the necessary site.

The Keyport Drydock Company, 77 River Street, Hoboken, N. J., has been incorporated with a capital stock of \$100,000 to operate a shipbuilding and repair plant. Gilbert A. Williams, Keyport, N. J.; E. LeClere Vogt, Morristown, N. J.; and William A. Stuhler, Jr., Hoboken, are the incorporators.

The Aero-marine Plane & Motor Company, Keyport, N. J., is building a plant for the manufacture of its products on the grounds of the local aviation school.

Fire, Dec. 16, destroyed part of the plant of the Empire Steel & Iron Company, Oxford, N. J., with damages estimated at \$10,000.

The John W. Cowper Company, Buffalo, construction engineer, who is erecting the extensive dyeworks plant of the Schoellkopf Aniline & Chemical Works, at Abbott Road and the Buffalo River, will commence soon after the first of the year the erection of a power plant, a 200-ton ice-manufacturing plant and a machine shop for the same company. The boiler house will be 121 x 198 ft., the ice plant will be 97 x 125 ft., two stories, and the machine shop, 90 x 300 ft., two stories. The Cowper Company also has the contract for the machinery equipment of these buildings, including a battery of six 1000-hp. boilers, for the power plant; coal bunkers, coal and ash-handling machinery, stokers, air compressors, a 200-ton ice plant and machine shop equipment.

The West Shore division of the New York Central Railroad has built a scrap-handling plant and rolling mill at Buffalo, just east of its roundhouse and machine shop at the Lackawanna Railroad crossing, where wrought scrap material will be converted into round and flat bars, etc.

The Strong Steel Foundry Company, Buffalo, has let contract for an extension to its foundry, 80 x 152 ft., of steel and brick.

The Utilities Machines Company, Buffalo, has been incorporated with a capitalization of \$100,000 by Leslie J. and Louis J. Bennett and W. H. Young, 110 Franklin Street. A factory will be erected at Main Street and Fillmore Avenue.

Plans have been drawn for a two-story factory for the manufacture of motors, to be erected on Niagara Street by A. B. Schultz, 786 Ashland Avenue, Buffalo.

Contract has been awarded to the J. G. White Engineering Corporation, 43 Exchange Place, New York, by the Eastern Pennsylvania Light, Heat & Power Company, for extensions and improvements to its power station at Palo Alto, including the installation of a 7500-kw. turbo-generator and transformers of 3000 kw. capacity, together with condensers, auxiliaries, etc.; the addition of one 500-kw. railway rotary, with transformers, and the installation of superheaters on all boilers.

The Ericsson Screw Machine Products Company, 601 Bergen Street, Brooklyn, N. Y., manufacturer of turned brass, steel and iron, has increased its capital stock from \$15,000 to \$50,000 in order to equip its new plant with additional machinery for which it has placed orders. It recently moved into new quarters at the above address in order to increase its

facilities adequately. E. W. Ericsson is president and general manager; C. J. Osterlind, vice-president and treasurer, and W. S. Bell, secretary.

The Samuel L. Moore & Sons Corporation, Elizabeth, N. J., is taking bids for the construction of an addition to its foundry, 40 x 200 ft., one story, of steel frame and brick construction. It has about completed a previous foundry extension. The Ring, Cleaves, Graham Company, Elizabeth, is the architect.

#### Catalogs Wanted

Francesco Camerini, Via Prince Umberto 20, Milan, Italy, is in the market for engine-lathes of all sizes, turret lathes, screw machines, milling machines of all types, grinding machines, planing machines, shaping machines, chucking and drilling tools, etc., and desires price lists, catalogs and particulars covering equipment.

## Philadelphia

PHILADELPHIA, PA., Dec. 26, 1916.

The Logan Coal Company, Harrison Building, Philadelphia, is in the market for a 5 to 8-ton, 36-in. track gage electric mine locomotive.

The Link-Belt Company, Nicetown, Philadelphia, will build a two-story, concrete and brick, machine shop, 230 x 250 ft.

The American Meter Company of Delaware, Philadelphia, has acquired from the American Meter Company of New York two factories at Seventeenth and Clearfield streets, and Race and Hicks streets, respectively, for manufacturing. The consideration is said to be \$163,000 for both properties.

Wray C. Arnold and Louis M. Stiles, Philadelphia, have incorporated in Delaware the Gey Mar Company, with a capital stock of \$100,000, to manufacture slot machines.

The Belmont Iron Works, Philadelphia, has been awarded contract by the Philadelphia Steel & Forge Company for the installation of a new crane runway at its plant, Milnor and Bleigh streets, to cost about \$5,000.

The John A. Roebling's Sons Company, Trenton, N. J., manufacturer of wire and wire rope, is arranging for the early erection of a new wire rope plant, and having special machinery designed for installation. The structure will replace the wire rope works destroyed about a year ago by fire, with increased capacity.

The Consumers' Ice Company, Chester, Pa., will double the capacity of its ice-manufacturing plant on the Delaware River. The installation will consist of a 75-ton ice machine, water-tube boilers and engine, estimated to cost \$135,000.

The Benjamin & Butler Iron Works, Hazleton, Pa., is building a new plant on the site of the former Hazleton sheet steel mill.

The Colton Demountable Rim Corporation has been incorporated at Dover, Del., with a capital of \$2,500,000 to manufacture rims for automobiles. L. B. Sheldon and L. N. Downs, New York City, and George H. Roeder, Brooklyn, N. Y., are the incorporators.

The Hook Foundry Company has been incorporated at Dover, Del., with a capital stock of \$50,000. Harry W. Davis, L. A. Irwin and M. L. Rogers, all of Wilmington, Del., are the incorporators.

The Philadelphia Supplies Company, Philadelphia, capital \$10,000, has been incorporated by William Deissler, 40 Wyoming Avenue, Haverford; John G. Soulsby, 318 South Nineteenth Street, and Christian Finkbeiner, 4246 North Franklin Street, to manufacture safety guards for transmission machinery.

The Never-Break Products Company, Bangor, Pa., capital \$10,000, has been incorporated by S. A. Teel, E. H. Stemitz and Lee Boyer to manufacture iron and steel brakeshoes.

## New England

BOSTON, MASS., Dec. 26, 1916.

The Colt's Patent Fire Arms Mfg. Company, Hartford, Conn., has received a contract for 4000 Vickers machine guns, extra parts, and accessories for the United States Government, at a cost of about \$6,200,000. The company expects to occupy its new building about Jan. 15. Enough work is in sight to keep the plant busy for a couple of years. Two years ago the company employed about 800 men and is now giving work to 3100, and it is expected the ultimate number of employees will be about 4000.

The Linderman Steel & Machine Company, Augusta, Me., has been incorporated with a capital stock of \$1,800,000. John Q. Ross is president; E. B. Turner, treasurer, and C. L. Andrews, Augusta, clerk.

The Blatchley Avenue plant of the Maxim Munitions Corporation, New Haven, Conn., was to be sold at auction Dec.

28. It is understood the building will be taken over by the A. C. Gilbert Company, which is now occupying part of the plant. One of the officials of the Maxim Munitions Corporation has stated that the purpose of the company in acquiring the plant was to manufacture machinery for its other plants on Grant Street, New Haven, and at Derby, Conn., and that this purpose having been fulfilled the shop and equipment are to be disposed of.

## Baltimore

BALTIMORE, MD., Dec. 26, 1916.

Officials of the Arundel Sand & Gravel Company, Baltimore, are planning to build a shipyard at Locust Point, using a small plant the company has as a nucleus. Frank A. Furst, president, 1515 Fidelity Building, Baltimore, will head the company. It is said that the plans first call for the construction of wooden vessels.

The Flynn & Emrich Company, founder, 305 North Holliday Street, Baltimore, will build a one-story foundry, 35 x 81 ft., at 307 to 311 North Holliday Street, at a cost of about \$2,000.

A. D. Newcomb, Norfolk, Va., president of the Newcomb Life Saving Boat Company, is understood to be looking for a site for a plant to manufacture non-destructible life boats.

Through the industrial department of the Baltimore & Ohio Railroad the Standard Grease & Glue Company will establish a plant at Curtis Bay, Md., at a cost of about \$100,000. It will be of concrete construction. George A. Whiting, 1500 Continental Building, Baltimore, will be the president.

## Chicago

CHICAGO, ILL., Dec. 26, 1916.

The Great Northern Railway Company, St. Paul, Minn., F. A. Bushnell, purchasing agent, has issued a list of equipment for which it is in the market. This is one of the largest lists ever put out by a railroad. Its extent can be inferred from the fact that the following covers only about one-tenth of it:

- One 55-ft. transfer table.
- One hand-power drill press.
- One vertical milling machine.
- Three double emery wheels.
- One keyseater.
- One grinding machine, 10-ft. centers.
- One 24-in. engine lathe.
- One 2000 cu. ft. air compressor.
- Six 5-ton cranes
- One 7-ton crane
- One 100-ton crane.
- One 51-in. vertical turret lathe.
- Two 2 1/4 x 26-in. turret lathes.
- One 42-in. engine lathe.
- One 60-in. punch and shear.
- One 1600-lb. steam hammer.
- One 600-lb. steam hammer.

The Pheoll Mfg. Company, Chicago, screw manufacturer, has purchased property at Twelfth Street and Waller Avenue at a cost of \$36,000, and is having plans prepared for a one-story factory building, estimated to cost \$50,000. Mason Phelps is president.

The Chicago Screw Company, Chicago, Ill., will erect a new plant on property just acquired, which gives it a site of approximately 20 acres.

The Venn-Severin Machine Company, 1317 West North Avenue, Chicago, will erect a one-story addition, to cost \$4,000, not \$2,000, as has been reported.

The Holt Mfg. Company, Peoria, Ill., is having plans drawn for a foundry building, 200 x 300 ft., to cost \$100,000.

Fire did \$200,000 worth of damage to the plant of the Brownell Improvement Company, Thornton, Ill., manufacturer of stone-crushing machinery.

The Stone Tractor Mfg. Company, Quincy, Ill., has been incorporated with a capital of \$100,000 by G. M. Stone, W. G. Brady, and J. Leslie Fullton.

The National Tractor Company, organized with a capital of \$250,000, will locate in Wichita, Kan. J. R. Johnson is president.

C. D. Edwards, Albert Lea, Minn., will purchase a second-hand angle bender to roll cold 3 x 3-in. steel angles and 2 to 3-hp. second-hand electric motors to operate on a 220-volt direct current.

The Hanna Engineering Works, 2059 Elston Avenue, Chicago, is in the market for electric traveling cranes, including one 20-ton to 30-ton crane, one crane with 75-ft. 6-in. span and one 48-ft. span.

The Buss Machine Works, Holland, Mich., has increased its capital from \$25,000 to \$100,000.

## Detroit

DETROIT, MICH., Dec. 26, 1916.

Little decrease is noted in the demand for machinery tools, in spite of the temporary slackening of manufacturing due to the season. Deliveries require from 3 to 6 months, and are unreliable. Prices continue their steady advance, and further increases are predicted. Detroit and the surrounding district are entirely free from labor troubles. Manufacturing plants are preparing for the biggest year in their history. Altogether 1917 will open with conditions more favorable for a great increase in the machine-tool business and similar lines than they have been in years.

To assist in relieving the freight congestion in this district, the Ford Motor Company has shut down for two weeks. The closing will cost the company thousands of dollars and throw it farther behind in its orders for machines, but the officers believed some remedy is necessary to relieve the freight condition in Detroit, which is threatening to paralyze all industries.

The Grand Rapids Grinding Machine Company, Grand Rapids, has been organized with S. Owen Livingston, J. DeKoning and Charles F. Hext incorporators, to manufacture grinding machines. Messrs. Livingston and DeKoning will be in active charge of the business, which is capitalized at \$25,000.

The Kawneer Mfg. Company, Niles, Mich., has let contract for the construction of a concrete factory which will add 58,000 sq. ft. to its present facilities. Francis J. Plyn is president, which is incorporated at \$1,200,000 to manufacture store fronts.

The St. Clair Brick Company, St. Clair, Mich., will use the proceeds of the sale of 3000 shares of stock to buy machinery to manufacture 20,000,000 brick per year.

The Murray-Kramer Motor Company, Detroit, has been incorporated with a capital stock of \$15,000 by Mathew A. Kramer, Walter C. Murray and Edward W. Griffith.

The Chase-Prost Mfg. Company, Detroit, has been incorporated with a capital stock of \$10,000 by Charles E. Prost, W. C. Chase and F. W. Irwin.

The capital stock of the Universal Car Equipment Company, Detroit, has been increased from \$50,000 to \$100,000.

The Columbia Motor Truck & Trailer Company, Pontiac, has increased its capital stock from \$35,000 to \$100,000.

The Grand Rapids Refrigerator Company, Grand Rapids, Mich., has built an addition to handle its increased business. Two 15-ton double crank stamp presses will be installed, and new annealing furnaces added.

The Williams Iron Company, Detroit, has been incorporated with a capital stock of \$200,000 for the refining, smelting, and manufacture of metals, ores and minerals. The stockholders are Harry E. Williams, Jean M. Williams, and Thomas I. Cochran, Detroit.

The Pontiac Tractor Company, Pontiac, Mich., has been incorporated by Norman A. Wright, Fred S. Welch, and Martin D. Hubbard, Pontiac, with a capital stock of \$42,000, to manufacture tractors, engines, and spraying machines.

The Arrow Tool & Reamer Company, Detroit, has been incorporated for the manufacture of machine and hand tools and supplies. John J. Kennedy, Roderick Mathieson, Jr., and Edward F. Griffith, Detroit, are the incorporators.

The Detroit Wood Products Company, Detroit, has been incorporated with a capital stock of \$25,000 to manufacture articles of wood, metal and clay, by M. L. Brown, A. L. Lott and B. S. Lewellen.

The Kellogg-Burlingame Company, Grand Rapids, Mich., has been incorporated at \$10,000 to deal in pumping machinery and power plant equipment. The stockholders are Robert B. Kellogg and M. V. Burlingame, Grand Rapids, and Charles J. Davis, Lansing.

The Enterprise Foundry Company, Muskegon Heights, Mich., has completed a three-story brick and steel factory, and is preparing for the installation of equipment which will make this foundry one of the most complete in the State for the production of plumbing fitting castings.

The Campbell, Wyant, Cannon Foundry Company, Muskegon Heights, Mich., has leased the entire foundry buildings of the Racine Boat Company, Muskegon, Mich., and will install additional equipment immediately. The newly-acquired building will be used for the casting of small parts for the Continental Motors Company, Muskegon.

The Lincoln Brass Works, Detroit, has been incorporated at \$15,000 for the manufacture of brass goods. E. H. Mueller, Detroit; John O. Stevens and B. Ellison, Highland Park, Mich., are the incorporators.

The Continental Motors Company, Muskegon, Mich., has begun work on a large addition to its plant. At least four drop hammers will be installed in the addition.



## Milwaukee

MILWAUKEE, WIS., Dec. 26, 1916.

Milwaukee manufacturers are beginning to feel the worst effects of the car shortage and traffic congestion, and production is now at a rather low ebb. Shop owners are taking advantage of the holiday season to obtain some relief from the conditions. In some lines of machinery manufacture warehouses are filled to overflowing, because no way is open to move the product. The situation is the worst known in years, and is doubly unfavorable because of the urgent demand for machinery. Deliveries of machine tools are being seriously delayed at a time when the sold-up condition of shops already has obliged purchasers to wait an unusual length of time for the goods. Immediate business has slackened perceptibly, but not nearly to so large a degree as in past years at this season. In the face of the unusual and wholly unprecedented conditions surrounding machine-tool trade manufacturers in these lines feel that business is unusually brisk. Delayed deliveries and advanced prices have not kept buyers off, as might be expected, and at this time it appears certain that all tool builders in this district will have no trouble in keeping all available capacity fully occupied until the beginning of 1918.

The Filer & Stowell Company, 217 Becher Street, Milwaukee, maker of Corliss engines and sawmill machinery, will have plans prepared at once for a five-story pattern storage house, machine and blacksmith shop, to replace the building destroyed by fire Dec. 15. The loss is about \$375,000. The plant again is in operation, only 75 to 80 of the total force of 600 men being idle. It is planned to start construction work soon after Jan. 1.

Marshfield, Wis., is taking bids until Jan. 5 for a sewage-disposal system, requiring a pump of 700 to 1000 gal. per min. capacity. John Seubert is city clerk.

The Line Materials Company, South Milwaukee, Wis., manufacturing materials for electric transmission systems, is erecting a one-story addition, 60 x 125 ft., of reinforced concrete.

The Chicago & Northwestern Railroad will erect a 29-stall roundhouse and small shop at Beach, near Kenosha, Wis., on a tract of 60 acres.

The Department of Public Works, Milwaukee, will buy an engine lathe for the municipal garage and machine shop. F. G. Simmons is commissioner.

The West Allis Scrap Iron & Metal Company, West Allis, Milwaukee County, has been organized with a capital stock of \$5,000 by S. Greenberg and N. Sherman.

The Board of Education, Escanaba, Mich., is calling for bids until Feb. 15 for an addition to the high school, to be devoted exclusively to manual training. It will be 47 x 100 ft., three stories and basement, and will require a complete equipment. The architects are G. Arntzen & Bro., Escanaba.

The Winther Motor Truck Company, Kenosha, Wis., is placing orders for a complete equipment of machine tools, etc., for its proposed factory, to be erected in the spring. Martin P. Winther is president.

The Charles W. Fish Lumber Company, Birnamwood, Wis., has decided to locate its third sawmill plant at Antigo, Wis. The Antigo Commercial Club furnishes a 30-acre site and \$5,000 in cash. Work on the erection of a mill costing \$50,000, and having an annual capacity of 8,000,000 ft. of logs, will begin about March 15. Charles W. Fish is president.

The Peerless Tire & Rubber Company, Green Bay, Wis., has been incorporated with a capital stock of \$50,000 by F. E. Burrell, John P. Jessen, and A. W. Brown. A tire and rubber goods plant in Akron, Ohio, has been purchased by the company, and later it is intended to transfer operations to Green Bay. In the meantime marketing will be done from Green Bay.

The McClellan Refrigerating Machine Company, Fond du Lac, Wis., has been incorporated with a capital stock of \$50,000 by J. W. Rosenbaum, A. Jens, and J. E. Ramsey, and is establishing headquarters at 12 East First Street, Fond du Lac.

The Gehl Brothers Mfg. Company, West Bend, Wis., maker of farm machinery and gas engines, is installing new machinery and equipment, including a bulldozer, punch, and riveting machine.

The Mechanical Appliance Company, 133 Stewart Street, Milwaukee, is building an addition, 45 x 60 ft.

Dr. Enoch Thulin, Landskrona, Sweden, manufacturer of aeroplanes, placed orders with the Gisholt Machine Company, Madison, Wis., for a number of lathes and other machine tools. He was accompanied by his factory superintendent, Robert Carlson, on his trip to Madison.

The McFarland & Westmont Tractor Company, Sauk City, Wis., has leased a factory building and equipment, where it will manufacture a new steel tractor.

The Wisconsin Iron & Wire Works, Milwaukee, Wis., will erect a factory at Becker and Booth Streets, to cost \$22,000.

The Nelson Company, Menomonee Falls, Wis., has changed its name to the Menomonee Falls Mfg. Company and has elected the following officers: J. B. Whittaker, president; M. L. Whittaker, vice-president, and C. F. Henzial, secretary and treasurer. It has added to the capacity of its machine shop and foundry, devoted to the manufacture of power transmission equipment.

## Cincinnati

CINCINNATI, OHIO, Dec. 26, 1916.

The local output of machine tools in 1916 has been larger than in any previous year, and while prices were advanced materially they barely kept pace with the increased cost of manufacture. Castings have advanced and to-day are costing more than ever before, and semi-finished parts such as gear blanks, shaftings, etc., have about doubled their price in two years. Including advances made in wages that are augmented by the bonus systems employed in nearly all shops, a serious factor to be reckoned with is determining the selling value of a machine tool. Another important item is the high cost of high-speed steel.

Early in the fall of 1915 the machinists' strike crippled a number of plants, but it was well over by March 1 of this year. In the early part of 1916 the volume of export business was larger than that from domestic sources, but later the automobile and auto-truck firms placed large orders, some of the machines being still under construction. The railroads were disappointing customers throughout the year, although many of them contracted for machine tools for replacement, and a few large lists were issued both by Eastern and Western railroads. All of these machines have not yet been bought. The Seaboard Air Line sent out a comprehensive list several months ago, but withdrew it after purchasing only a limited number of machines.

Business from the rolling mills was excellent throughout the year and orders from that source are still coming in.

Boiler and tank makers were busy the entire year, but the high cost of plates and heavy sheets forced advances in the spring and fall. Makers of small and medium electric generators and motors, as well as portable electric drilling and grinding machines, enjoyed an excellent business, much of which was from abroad. Jobbing foundries melted more iron than in any previous year.

Definite totals from the city building commissioner's office are not yet available, but for 11 months ended Nov. 30, estimates for improvements will exceed the entire year of 1915. Manufacturing buildings now under construction include the immense machine-tool plants of the American Tool Works Company and of the R. K. LeBlond Machine Tool Company. In Oakley suburb the Cincinnati Planer Company, Cincinnati Milling Machine Company and the Modern Foundry Company all made extensive additions to their plants, and almost every manufacturing company in the city has added to its equipment. The John A. Oberhelmann Foundry Company has fitted up its large new foundry on Colerain Avenue and the Elmwood Castings Company reports that the addition to its plant recently completed is now in full operation.

The Cincinnati Screw Company, Cincinnati, has increased its capital stock from \$200,000 to \$500,000 and will enlarge the output of its plant fully 75 per cent. Practically all the necessary equipment has been purchased. B. B. Quillen is vice-president and general manager.

The Heekin Can Company, Cincinnati, has purchased a building in Norwood, a suburb, that will be fitted up as a branch plant for the manufacture of metal specialties. Its city plant will be devoted almost exclusively to making cans.

The Cincinnati Horseshoe & Iron Company, Cincinnati, has acquired a site adjoining its plant near Cleves, Ohio, and is having plans prepared for additions that will double its present output.

The Globe Soap Works Company, Cincinnati, has bought additional property adjoining its present plant and has tentative plans under way for increasing its capacity. Building details are lacking.

The Dayton Wre Wheel Company, Dayton, recently incorporated, has arranged for the purchase of the Pinneo & Daniels Company's plant in Edgemont, a suburb, and will soon install additional machinery to manufacture wire wheels.

The Monitor Motor Car Company, Columbus, Ohio, is increasing the capacity of its plant for the manufacture of automobiles. It is capitalized at \$1,000,000 and its present output is 3000 cars per annum.

The W. F. Robertson Steel & Iron Company, Cincinnati, is in the market for rivet-heading machines for making cold rivets of  $\frac{3}{8}$ -in. diameter and smaller.

The Paramount Motor Company, 1432 South Parsons Avenue, Columbus, Ohio, will purchase a 100 to 150-hp. Diesel engine, either stationary or marine type, single or multi-cylinder, in good shape.

## Cleveland

CLEVELAND, O., Dec. 26, 1916.

The demand for machinery has fallen off slightly, although dealers report a fair volume of orders for single tools and small lots. Peace talk has apparently had no effect on the local machinery market. Mention was made last week of an inquiry for a round lot of machinery for a plant to be established in Cleveland to manufacture steel wheels for automobile trucks. The company to operate this plant has been incorporated as the Loomis-Sielaff Company, and is now placing orders for its machine-tool equipment. The National Carbon Company has made further purchases of machinery. Some scattering business is now coming from the automobile trade, which has not been very active recently. Operations of manufacturing plants in Cleveland and vicinity are being seriously handicapped by railroad embargoes that are interfering with shipments of coal, raw stock, and finished product.

The Valley Smelting Company, Cleveland, recently incorporated with a capital stock of \$250,000, has leased a 13-acre site near the junction of the Cuyahoga River and the Baltimore & Ohio Railroad and will engage in refining waste material and dealing in non-ferrous metals. Cleveland and Detroit interests, represented by the Michigan Smelting & Refining Company, are promoting the new company. James Sillman, president Michigan Smelting & Refining Company, is president; Charles O. Patch, vice-president; H. B. McGraw, secretary, and H. D. le Bel, general manager.

The National-Acme Company, Cleveland, has completed plans for the erection of its new screw machine products department at East 131st Street and Coit Road which includes two steel and concrete one-story buildings, 482 x 603 ft. and 52 x 603 ft. respectively. George S. Rider & Co. are the architects.

The Union Engineering Company, Cleveland, has purchased the box manufacturing plant of the J. H. Hahn Company, West Third Street, which it will remodel for the manufacture of hoisting and conveying machinery.

Announcement has been made to stockholders of a plan for the consolidation of the Cleveland Foundry Company, the Cleveland Metal Products Company and the Cleveland Factory Company into a corporation capitalized at \$10,000,000, to be known as the Cleveland Metal Products Company. These companies are controlled by F. E. Drury and associates and no change will be made in the management. The Cleveland Foundry Company manufactures oil stoves; the Cleveland Metal Products Company makes aluminum sheets and aluminum utensils, and the Cleveland Factory Company owns the real estate upon which the plant of the Cleveland Foundry Company is located. According to the plan the Cleveland Metal Products Company will increase its present stock to \$5,000,000 7 per cent preferred and \$5,000,000 common stock, \$4,000,000 of each to be issued at this time.

The Combination Stove Company, Cleveland, has been incorporated with a capital stock of \$50,000 by Richard Ryan, N. C. Criswell, Warren C. Jones and others.

The Atlas Bolt & Screw Company, Cleveland, which will shortly begin the erection of a new plant, has increased its capital stock from \$200,000 to \$500,000.

The Carbo-Hydrogen Company, Cleveland, has just acquired a site on which it will erect a plant for the manufacture of carbo-hydrogen gas for welding purposes.

The Britton Carbureter Company, Cleveland, has been incorporated with a capital stock of \$50,000 by L. M. and A. C. Diehl, P. C. Jones and others.

The Foster Bolt & Nut Mfg. Company, Cleveland, has increased its capital stock from \$25,000 to \$300,000.

The Premier Mfg. Company, Ravenna, Ohio, recently formed to manufacture lock washers, has elected the following officers: C. H. Judkins, Cleveland, president; R. D. Judkins, vice-president, and W. E. Judkins, secretary-treasurer.

The Buckeye Twist Drill Company, Alliance, Ohio, has increased its capital stock from \$150,000 to \$1,000,000 as preliminary to plant additions which it has under consideration. According to plans, a new building will be erected shortly and additional equipment required.

The Canton Metal House Company, Canton, Ohio, has been incorporated with a capital stock of \$300,000 and plans to erect a plant, 50 x 300 ft., to manufacture portable metal buildings. H. S. Renkert, C. A. Weirich and others are active in the company.

The Sell House Goods Company, Canton, has been sold to Eastern interests and will be incorporated with a capital stock of \$200,000. The plant will be enlarged to three times its present capacity and devoted entirely to the manufacture of sporting goods.

The Lima Metals Foundry Company, Lima, Ohio, has been incorporated with a capital stock of \$15,000 by W. J. Newman, A. G. Bush and others.

The Vulcan Drop Forge Company, Sandusky, Ohio, has been incorporated with a capital stock of \$350,000 by Gustave Von Densteinen, C. N. Horn, Paul J. Bickel and others. It is stated that the company will build a plant near that of the Suspension Roller Bearing Company.

The Penn Mold & Foundry Company, Dover, Ohio, expects to have its new foundry, 84 x 270 ft., completed late in January. Three traveling cranes will be installed. It will make ingot molds and will consume about 100 tons of molten metal per day from the adjoining blast furnace of the Penn Iron & Coal Company.

The American Sewer Pipe Company, Akron, Ohio, will erect a new plant at Toronto, Ohio, on the site of the Ohio Valley Brick Works recently destroyed by fire. Plans are being prepared by Robert Russell, the company's chief engineer.

The Morral Heater Company, Morral, Ohio, has been formed to manufacture gas stoves. S. E. Morral is president; Charles Robbins, vice-president and general manager; D. D. Mahaffey, secretary, and J. T. Lucas, treasurer.

The Gilliam Mfg. Company, Canton, Ohio, which recently increased its capital stock, did not change its name to the Gilliam Company, as stated in THE IRON AGE of Dec. 7. Huntlie Gordon, formerly president and treasurer of the Novelty Iron Works, and Clarence M. Converse, formerly general sales manager of the same company, have both been elected directors of the Gilliam Mfg. Company, the former being also treasurer and the latter vice-president.

## Indianapolis

INDIANAPOLIS, IND., Dec. 26, 1916.

The Catlin-Robbins Mfg. Company, Indianapolis, has been incorporated with \$25,000 capital stock to manufacture tin pails, etc. The directors are T. S. Catlin, H. W. Robbins and A. P. Catlin.

The Indianapolis Specialty Supply Company, Indianapolis, has been incorporated with \$25,000 capital stock to manufacture fruit jar holders and other articles. T. S. Catlin, H. W. Robbins and A. P. Catlin are the directors.

The Stout Furniture Company's factory No. 1, at Salem, Ind., burned Dec. 19, with \$150,000 loss. The flames spread to the plant of the Interstate Public Service Electric Company, which was also destroyed, with a loss of \$50,000.

The Metal Washer Company, Muncie, Ind., has been incorporated with \$10,000 capital stock to manufacture washers. The directors are J. A. Peterson, F. M. Williams and A. Williams.

The Indiana Truck Corporation, Marion, Ind., has been incorporated with \$100,000 capital stock to manufacture motor vehicles. The directors are C. G. Barley, J. W. Stephenson and S. W. Winder.

The Whiteley Malleable Castings Company, Muncie, Ind., has increased its capital stock from \$250,000 to \$450,000.

The Globe Stove & Range Company, Kokomo, Ind., has increased its capital stock from \$600,000 to \$700,000.

The Hammon Optical Machine Mfg. Company, Vincennes, Ind., has been incorporated with \$15,000 capital stock to manufacture optical supplies. The directors are R. R. James, J. H. Hammon and Joseph Maddigan.

The C. R. Folsom Iron Works, Walkerton, Ind., has been organized with a capital of \$35,000 to manufacture tanks, gas holders and pipes. The incorporators are Oscar C. Shockney, William A. Endley, Vern W. Hardenbrook and Samuel E. Koontz.

## The Central South

LOUISVILLE, KY., Dec. 26, 1916.

A temporary let-down is noted in the iron and machinery trades. Inquiries continue numerous, however, and manufacturers report continued difficulty in obtaining materials. A recent contract for installing motor drive in a local factory was decided on the basis of quick delivery of motors. A number of important ice-manufacturing projects are in hand, while oil refinery developments in Kentucky are reported.

The Frey Planing Mill, Louisville, Ky., is electrifying its plant, installing 325 hp. in motors, ranging from 2 to 50 hp.

The Vogt Brothers Mfg. Company, Louisville, Ky., has purchased the business and plant of the Huetteman & Cramer Mfg. Company, Detroit, Mich., at a figure reported to be \$50,000, and will move the equipment and stock to Louisville. The Louisville company will engage in the manufacture of ice-making machinery.

The Franklin Motor Car Company, Lexington, Ky., has been incorporated with \$20,000 capital stock by B. F. and Stanley Stone and William H. Phillips.



The Perry Ice & Coal Company, Hazard, Ky., has increased its capital stock from \$10,000 to \$23,000, in consideration of improvements to be made.

The City Council, Owensboro, Ky., has approved the installation of an additional 1500-hp. turbine generator in the municipal power plant. A Westinghouse turbine will be purchased at a cost of \$26,000.

The Hull Pump & Tank Company, Owensboro, Ky., will move its plant to Indianapolis at once. The company has business to the amount of \$1,000,000 on its books and has experienced difficulty in obtaining materials in Owensboro. Nat D. Hull is president.

The Orchestral Pipe Organ Company, Nashville, Tenn., has been incorporated with a capital stock of \$25,000 by M. H. Swalowski, R. R. Oglesby, W. E. Bridwell, and others.

The Southern Motor Car Company, Memphis, Tenn., will shortly let a contract for a new sales and garage building to cost \$17,000. S. H. Butler, Como, Miss., is president.

The John G. Duncan Company, Knoxville, Tenn., wants dealers' prices on 16, 20, 30, 35 and 45-lb. relay rail, with lowest freight rate to Knoxville.

## Birmingham

BIRMINGHAM, ALA., Dec. 26, 1916.

General trade conditions are better than at any time this year. Wholesale machinery reflects these conditions. A strong new demand is noticeable for mining equipment owing to a number of new and large openings. The demand for hydroelectric apparatus is still maintained. The sawmill trade is steady. With money easy and farmers prosperous, mills booked to capacity and wage advances all around, the outlook is excellent.

The Imperial Coal & Coke Company, Birmingham, Morris Bush president; will make a 1000-ton opening at Bradford mines in Jefferson County.

The Republic Iron & Steel Company, Birmingham, will expend \$500,000 in improvement of its coal mines at Palos, Ala., its furnace property at Thomas, Ala., etc.

The American Forging Company, Birmingham, will install apparatus for making automobile forgings. R. I. Ingalls is president.

The Hanna Handle Company, Macon, Ga., incorporated with capital stock of \$15,000 and privilege to increase to \$100,000 by Clay Hanna, W. M. Fowler, and others, plans to manufacture handles for tools.

Ernest Kreher, Tampa, Fla., and associates, are reported as having perfected plans for the establishment of a shipbuilding plant to cost about \$750,000.

The Port Wentworth Lumber Company, Savannah, Ga., has purchased 43,000 acres of timber in Georgia and South Carolina, at a cost of \$350,000. A pulp mill is to be erected.

## St. Louis

ST. LOUIS, MO., Dec. 26, 1916.

The machine-tool trade has been somewhat quieter than in the previous week on account of year-end activities. Practically all the demand from this territory continues to be for domestic needs and is not affected to any extent by the war conditions, or peace talk. The impression prevails that domestic needs will keep up at a high speed for some time.

The Del-Home Light Company, St. Louis, has been incorporated with a capital stock of \$15,000 by W. O. Waldsmith, F. W. A. Vesper, and others, to manufacture electric light fixtures, etc.

The Wellston plant of the Polar Wave Ice & Fuel Company, St. Louis, was burned Dec. 22 with a loss of about \$25,000.

The Jackes-Evans Mfg. Company, St. Louis, will equip a building, to be built for it at a cost of \$100,000, for the manufacture of sheet-iron products.

The Double Drive Motor Company, Kansas City, Mo., has been incorporated with a capital stock of \$500,000 by Theodore Ditmars, Walter Beck and S. B. Gatewood to manufacture automobiles, tractors, etc.

The Builders' Roofing Company, Kansas City, Mo., has been incorporated with a capital stock of \$17,500 by A. J. Shirk, J. F. Stocker and E. A. Thompson to manufacture roofing material.

The Beard-Qualls Company, Box 359, Carthage, Mo., George W. Qualls, president, is in the market for equipment for the manufacture of both explosion and ignition fuse.

The Kansas City Folding & Marking Machine Company, Kansas City, Mo., has been incorporated with a capital stock of \$10,000 by A. E. Isaiah, W. and W. C. Liggitt and will manufacture folding and marking machines.

The Beall Brothers Tool Company, Alton, Ill., will double its capital stock, from \$150,000 to \$300,000, and will make additions to its tool-making plant.

The St. Louis Southwestern Railway, St. Louis, Mo., will construct and equip a roundhouse, repair shops, etc., at East St. Louis, Ill., to cost about \$600,000.

The plant of the Golden Grain Milling Company, East St. Louis, Ill., was destroyed by fire Dec. 20 with a loss of about \$300,000. The plant will be rebuilt.

The Little Rock Motor Car Company, Little Rock, Ark., has been incorporated with a capital stock of \$10,000 by F. N. Fisher, D. M. and E. B. Armstrong, and others, and will equip a machine and repair shop.

George W. Fair will erect a garage at Little Rock, Ark., requiring about \$5,000 worth of mechanical equipment.

The Citizens Gin Company, Dermott, Ark., has decided to replace its cotton ginning and power plant, destroyed with a loss of \$10,000.

The Earle Electric Light Company's plant, Earle, Ark., has been destroyed by fire; also the C. T. Whitman lumber plant, with a total loss of \$60,000.

The E. L. Bruce Company, Little Rock, Ark., will rebuild its wood-working plant and hardwood-working machinery will be installed to cost about \$75,000.

The Sapulpa Refining Company, Sapulpa, Okla., will increase its capital from \$1,000,000 to \$2,000,000 to increase its refining plant equipment.

The Consumers' Light & Power Company, Ardmore, Okla., has been incorporated with a capital stock of \$1,000,000 by Paul E. Ekern, W. D. Potter and P. C. Kings to erect and equip public service plants.

The Laverne Electric Light, Ice & Power Company, Laverne, Okla., has been incorporated with a capital stock of \$30,000 and will equip a plant at a cost of about \$30,000. W. H. Lewis and others are interested.

Lindsay, Okla., has voted \$8,000 for the purchase of machinery for its electric light and waterworks plants.

W. O. Cawthon, Muldrow, Okla., will equip a cotton ginning plant and is in the market for about \$6,000 worth of machinery.

The Greenville Ice & Coal Company, Greenville, Miss., W. Isenberg, president, will equip a raw-water ice plant at a cost of \$46,000 with a daily capacity of 125 tons.

The Trans-Mississippi Terminal Company, New Orleans, La., will expend about \$350,000 for new equipment and extensions of its terminal facilities, especially mechanical loading and unloading devices.

The Southern Drydock & Shipbuilding Company, New Orleans, La., M. P. Doullot president, will install equipment for a shipbuilding plant. F. C. Hymee is manager.

Penick & Ford, New Orleans, La., will equip a cold storage plant at a cost of about \$75,000 for machinery.

The Peavy-Wilson Lumber Company, Leesville, La., will equip a mill with a daily capacity of about 150,000 ft. A. J. Peavy, Shreveport, La., is president.

The Berry Iron & Steel Company, St. Joseph, Mo., will purchase a 10-ton jib crane with 16-ft. x 6-in. mast and 20-ft. jib.

## Texas

AUSTIN, TEX., Dec. 23, 1916.

Prospects for an unusually large business in Texas and the Southwest in the coming year, are reported generally by the machinery and tool trades. The business for 1916 shows a substantial gain over that of the preceding year.

It is announced that the consolidation of the Texas Traction Company and the Southern Traction Company under the name of the Texas Railways Company will take place soon. The former company operates an interurban electric line between Dallas and Denison and the latter company a similar line between Dallas and Waco and Dallas and Corsicana. It is planned to extend the Waco line south to San Antonio, via Austin, a distance of about 185 miles, shortly after the merger goes into effect.

E. S. Brodix, Brownsville, and associates, plan to construct a harbor and port works at the mouth of the Rio Grande River. It is also announced that the de facto government of Mexico is considering plans for a similar improvement on the Mexican side of the river, adjacent to the mouth of that stream. The Monterey-Matamoros division of the National Railways of Mexico will be extended down the river from Matamoros, a distance of about 30 miles, as a means of aiding in the development.

The Celina Mill & Elevator Company, Sherman, has been reorganized with a capital stock of \$160,000. It will build

a 500,000-bu. grain elevator. Machinery will be required. G. B. R. Smith is president.

The Parkersburg Tank Company, manufacturer of cypress tanks, plans to move its plant from Beaumont to Houston. Additional machinery will be installed.

The Gates Handle Company, Beaumont, will install additional machinery and greatly enlarge its handle factory.

The Alexander Gilmer Lumber Company, Jasper, will rebuild its roundhouse and machine shop recently destroyed by fire.

## San Francisco

SAN FRANCISCO, CAL., Dec. 19, 1916.

Machine-tool activity has increased materially in the last few weeks. Purchases have been made on several large lists, and the call for small groups and single tools is exceptionally active, although buyers complain at prices, and some business is lost on that account. Some of the largest manufacturing interests show great confidence in the future, buying quite largely for distant delivery. Automatic and special-purpose machinery is in stronger demand here than ever, with deliveries especially slow. General industrial development appears to be increasing.

The Dow Pump & Diesel Engine Company has just completed the adaptation of its 4-cycle true Diesel engine for marine use, and is ready to put it on the market.

The Holt Mfg. Company, Stockton, Cal., is starting work on another machine shop, 100 x 300 ft., and has ordered tools amounting to approximately \$75,000 among local houses.

The Western Pacific Railroad shops near Sacramento are now employing 290 men, and have under way \$130,000 worth of car construction.

The East Bay Foundry Company will open a new plant shortly at Chestnut and Thirty-second streets, Oakland. William Cobb is president.

The Pacific Coast Borax Company is preparing to install two new rotary kilns at its plant in Death Valley, Cal., increasing the output by 250 tons.

The General Roofing Mfg. Company, which recently built a plant at Richmond, Cal., is preparing to triple its capacity.

The Krogh Mfg. Company, 149 Beale Street, San Francisco, manufacturer of large irrigation pumps, concentrators, etc., has purchased a lot on Fremont Street for its local plant.

A. L. McKelvey has bought out the machine shop of Robert Harron, Avalon, Cal.

The Mowry Machinery Company, Los Angeles, has been incorporated with a capital stock of \$500,000 by C. A. Markwell, S. F. Mowry, and L. Bulkeley.

The Sacramento Valley Colony Company, Willows, Cal., is preparing to install 70 electric pumping plants for irrigation.

## The Pacific Northwest

SEATTLE, WASH., Dec. 19, 1916.

Box manufacturers in the Northwest are looking forward to a big trade in 1917. At present practically every plant in the Puget Sound country is working night shifts to fill present orders. The Anacortes Lumber & Box Company, Bellingham, Wash., is making extensions to its box-manufacturing plant, which will increase its capacity 40,000 ft. daily. The Morrison Mill Company of that city is also expending \$20,000 in increasing the box department of its plant, and the Fidalgo Lumber & Box Company is making extensions to care for increased business.

Figures available show that the Port of Seattle's water-borne commerce for the first eleven months of 1916 aggregated \$380,651,842. These figures represent a gain of \$145,495,895 over the same period for 1915. The figures show a tremendous expansion in foreign commerce. The customs business for the month of November amounted to \$24,723,404, a gain of more than \$5,000,000 over November, 1915.

Agents of the Entente Allies have resumed negotiations with lumbermen here for a supply of spruce to be used in construction of more airplanes, and a large order is reported to be pending. Lumber orders and production in the Northwest were both increased the past week, with shipments lighter. The unshipped balance of orders amounts to 11,831 carloads, about 6,000 above normal.

The City Council, Seattle, Wash., will take bids at once for furnishing equipment for the proposed addition to the auxiliary steam power plant operated by the city on Lake Union. The machinery will include air, water pumps, boiler feed, and service pumps, a turbo-generator, etc., and will cost \$350,000.

The plant of the Kleeb Lumber Company, South Bend,

Wash., was destroyed by fire recently with a loss of \$200,000. It is reported the owners will rebuild.

The Scandinavian-American Shipbuilding Company, Portland, Ore., has recently been incorporated for \$200,000 by Dr. E. T. Hedlund, Claude McCulloch, L. R. Bailey, and J. R. Rose, all of Portland. It has a site in Portland, and expects to start construction work about Jan. 1.

The Washington-Idaho Water, Light & Power Company, Lewiston, Idaho, has purchased the system and plant of the Lewiston & Clarkston Improvement Company, and plans a new power plant to develop 50,000-hp.

The Oregon Iron & Steel Company, Oswego, Ore., plans to resume operations at its Oswego plant at once, having recently secured several large pipe contracts.

The Polson Implement Company, Seattle, has recently filed articles of reincorporation, marking its 50 years of operation in King County. This is the first reincorporation in the State. The laws of Washington provide that the life of a corporation shall be 50 years. The company is reincorporated for \$200,000, with Perry Polson, Seattle; A. R. Dunlap, La Conner, and O. H. Polson, Seattle, trustees.

The Northwestern Fisheries Company, Seattle, a subsidiary of the Booth Fisheries Company, has recently purchased from the Lindenberger Canning Company its Roe Point and Seldovia canneries, both located in Alaska. It also plans to immediately rebuild its plant at Kenai, Cook Inlet, Alaska, destroyed by fire last May.

The Columbia Engineering Works, Portland, has recently secured contracts for nine wooden auxiliary vessels, which will be constructed at its Linnton plants. Two new shipways have recently been constructed. The contracts amount to about \$1,000,000.

The Olympia Light & Power Company, Olympia, Wash., plans the construction of a steam auxiliary plant of 1000-hp., to cost \$40,000, adjoining its present plant at Tumwater.

It is reported that Twohy Brothers, Portland, in connection with the proposed enlargements and extensions to their Portland plant, also plan the installation of equipment for the manufacture of semi-Diesel engines on a large scale. The company recently secured contract for the construction of 200 cars for the Union Pacific.

The Burbank Machinery Company has recently moved its headquarters from the L. C. Smith Building to 3223 First Avenue South, Seattle, where it has installed a machine shop and warehouse. F. S. Burbank is president.

The Latham Ice Machine Company, Spokane, Wash., has been formed and plans to manufacture a patented ice-making machine.

The Modern Box Factory, St. Maries, Idaho, plans improvements to its plant to cost \$25,000. Machinery will be required. E. L. Clark is the proprietor.

The Hunter-Wiles Mfg. Company, Spokane, Wash., has been incorporated for \$500,000 to establish a plant for the manufacture of a patented concentration table for mining mills. J. W. McBride, Robert Hunter, Carl Wiles, and others are the incorporators.

The Thomas Pulp & Paper Company, Vancouver, Wash., has been incorporated for \$2,000,000 and plans the construction of a paper mill in Portland, Ore., to manufacture paper. It is stated the plant proposed will cost \$1,000,000. Robert Thomas is president.

## Canada

TORONTO, ONT., Dec. 26, 1916.

The National Iron Works, Toronto, which has recently been manufacturing munitions, will make additions to its plant to take care of orders for shell forgings.

The Miller Munition Company, Toronto, will erect an addition to its plant, to cost \$2,000.

The Bowden Machine Company, 163 Sterling Road, Toronto, has been granted a permit to erect an addition to its plant, to cost \$3,000.

W. H. Bamfield, 372 Pape Avenue, Toronto, will erect an addition to his munitions factory, to cost \$10,000.

The Canadian Vickers, Ltd., Montreal, will double its shipbuilding facilities and will provide for building vessels up to 12,000 tons.

The Frost Steel & Wire Company, Hamilton, Ont., is in the market for a 3- to 5-ton stiff-leg derrick, motor-driven.

The general contract for the erection of a plant for the United Shoe Machinery Company, Bennett Street, Maisonneuve, Que., has been awarded to the Deacon Construction Company, 37 Mayor Street, Montreal, and the steel work to the Dominion Bridge Company, Lachine, Que.

Vancouver, B. C., has purchased a site on the Bridge River, near Lillooet, B. C., where it will build a power plant. W. McQueen is city clerk.



The Adams Brothers Harness Mfg. Company, McDermott Avenue East, Winnipeg, is having plans prepared for the erection of a factory at Saskatoon, to cost \$125,000.

The Huntley Mfg. Company, Silver Creek, N. Y., builder of cereal-milling and canning machinery, has purchased property at Tillsonburg, Ont., which it will equip for manufacturing. The company will erect another building there next spring.

The H. Lougheed Machinery Company has taken over the building of the Canadian Woodworkers, Ltd., Sarnia, Ont., which it will equip for manufacturing purposes.

The Amalgamated Engineering & Drydock Company, Vancouver, B. C., is making preparations for the construction of a shipbuilding plant on Burrard Inlet, B. C., at a cost of \$5,000,000.

The Dominion Iron & Wrecking Company, Quebec, has taken over the plants of the Standard Steel Foundries at Outremont and the Consolidated Brass Foundries at Point aux Tremble, Que., with the intention of consolidating for the manufacture of munitions. New equipment will be installed, including 15 electric furnaces, at the Consolidated Brass Foundries' plant.

The waterworks board, Aylmer, Ont., proposes to install two new gas engines in the waterworks plant. D. C. Davis is clerk.

John Rolston, Cayuga, Ont., is in the market for a gas engine, pump, etc.

Plans are being prepared by Bigoness & Bigoness, 60 Notre Dame Street East, Montreal, for the erection of a concrete and brick factory for the Dominion Aircraft & Mfg. Company at Laval de Montreal, Que., to cost \$20,000. W. H. Parker, 101 St. Luke Street, Montreal, is manager.

The New Brunswick Pulp & Paper Company, Ltd., Millerton, N. B., has commenced work on the erection of a new mill, to cost \$150,000. J. D. Volckman is secretary.

T. G. Brighan, 85 Duke Street, Ottawa, is in the market for asphalt-handling machinery, including shafting, sprocket wheels, pulleys, chain drivers, bucket elevators, etc.

The Spencer Heater Company of Canada, Ltd., Toronto, has been incorporated with a capital stock of \$500,000 by Tilman H. O'Neill, Albert T. Hawley, Archibald Campbell, and others, all of Winnipeg, to manufacture boilers, heaters, furnaces, etc.

The Stave Mfg. Company, Ltd., Montreal, has been incorporated with a capital stock of \$50,000 by Harold Wooland, Walter H. Thomson, Walter F. Lee, and others to manufacture staves, etc.

Forgings, Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by William H. Irving, 10 Adelaide Street East; Henry H. Davis, 143 Bloor Street West; Edward H. Brower, and others to manufacture war munitions, shells, etc., and will commence the erection of a plant at Toronto.

The Cluff Ammunition Company, Ltd., Toronto, has been incorporated with a capital stock of \$1,500,000 by Arthur W. Holmsted, 20 King Street East; Lorne F. Lambier, Norman R. Kay, and others to manufacture explosives, munitions, shells, etc.

The Castle Mfg. Company, Ltd., Toronto, has been incorporated with a capital stock of \$100,000 by John C. Macfarlane, 23 Adelaide Street East; Ernest C. Fetzer, Armond Whitehead, and others to manufacture toys, bicycles, metal castings, forgings, etc.

The Standard Stampings, Ltd., Toronto, has been incorporated with a capital stock of \$45,000 by James F. Edgar, 59 Yonge Street, and Norman R. Tyndall, both of Toronto; James E. Maybee, Port Credit, Ont., and others to manufacture stampings, tools, etc.

The Groch Centrifugal Flotation, Ltd., Cobalt, Ont., has been incorporated with a capital stock of \$25,000 by Frank Groch, John Raftis, Edward Donegan, and others to manufacture mining machinery, tools, implements, etc.

The St. Catharines Machinery Company, Ltd., St. Catharines, Ont., has been incorporated with a capital stock of \$40,000 by Ernest W. Marks, George Wilson, Harry Shortt, and others to manufacture machinery, tools, shells, etc.

George W. Stout, Ltd., Hamilton, has been incorporated with a capital stock of \$40,000 by George W. Stout, Louis D. Johnson, George Swanwick, and others to manufacture automobiles, trucks, engines, etc.

The South Bay Power Company, Ltd., Toronto, has been incorporated with a capital stock of \$1,000,000 by Alexander Fasken, James Althison, 36 Toronto Street, and others.

The Rosedale Motors, Ltd., Toronto, has been incorporated with a capital stock of \$200,000 by Walter G. Hammond, 24 King Street West; Alexander McInnes, and others to manufacture automobiles, trucks, etc.

The Climax Baler Company, Hamilton, Ont., is in the market for 10-ft. power square shears to cut 3/16-in. plates.

The Cummer-Dowswell Company, Hamilton, Ont., manufacturer of clothes wringers, washing machines, etc., will build an addition to its plant, to cost \$16,000.

The Canadian Allis-Chalmers, Ltd., Rockfield, Que., will build an addition to its forge plant.

The Russell Motor Car Company, Toronto, will erect a boiler-house on Mowat Avenue, to cost \$2,000.

Hoffer Brothers, Vancouver, B. C., plan the construction of an addition to their plant at Coal Harbor for the construction of aeroplanes.

The Aetna Iron & Steel Company, Ltd., Victoria, B. C., has been incorporated for \$250,000, with David Milne, Joshua Kingham, Samuel M. Officer, trustees.

Plans for the plant of the Vulcan Iron Works, to be located on Industrial Island near Vancouver, B. C., are now under way, and include a main workshop and boiler room, 105 x 230 ft., and plate storeroom, 40 x 75 ft.

## Government Purchases

WASHINGTON, D. C., Dec. 26, 1916.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until date not set, schedule 542, for one 30-in. x 5-ft. 3-in. lathe for Fort Mifflin, Pa.; schedule 546, for one 16-in. wood-working lathe, two 26-in. bandsaws and one 12-in. saw table, all for Philadelphia; schedule 548, for one motor-driven pressure blower, one 16-in. high-speed and one 30-in. radial drilling machine, one 14-in. and one 16-in. engine lathes, one 14 x 56-in. pattern-maker's lathe, one screw-cutting lathe, one milling machine, one 4-in. diameter hacksaw, one bandsaw with 30-in. wheels, and one column-shaping machine, all for Brooklyn; schedule 549, three lathes to swing 12-in. overhead, for Philadelphia; schedule 550, for two 26-in. turret lathes, for Brooklyn; schedule 551, for furnishing and installing an exhaust system, for Boston.

The chief of the Bureau of Yards and Docks, Navy Department, Washington, will receive sealed proposals until 11 a. m. Jan. 2 for furnishing two 300-kw. motor generator sets for Norfolk.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, Dec. 19, for supplies for the naval service as follows:

### Schedule 413, Ordnance

Class 13, Washington—Three geared head lathes—Bid 85, \$1,680; 96, \$1,600; 114, \$1,560; 124, \$1,058; 146, \$1,657.

Class 14, Washington—Two geared lathes—Bid 85, \$3,478; 96, \$2,955; 146, \$3,295.

Class 15, one power gap shears—Bid 22, \$221.10 items 2 to 5; 96, \$2,218; 118, \$2,266.75; 124, \$248.25; item 1 omitted; 146, \$3,395; 159, item 1, \$2,400.

### Schedule 414, Ordnance

Class 16, Washington—Two electrically driven geared head lathes—Bid 85, \$1,250 and \$1,920; 96, \$1,862.

Class 17, Washington—Two selective-geared head lathes—Bid 85, \$1,988; 96, \$2,045; 114, \$1,832.

Class 18, Washington—One selective-geared head lathe—Bid 85, \$2,033; 96, \$2,140; 114, \$1,900.

Class 19, Washington—Two plain high-power milling machines—Bid 13, \$3,302; 85, \$3,423.

### Schedule 426, Ordnance

Class 45, Washington—Two hand-screw machines—Bid 9, \$583; 13, \$880 and \$840; 85, \$650; 108, \$1,629; total; 125, \$514; 149, \$675.

### Schedule 427, Construction and Repair

Class 51, Philadelphia—One pneumatic riveting machine—Bid 41, \$539.88 and \$549.40; 96, \$519 and \$528; 161, \$538.88; 176, \$539.88; 180, \$810.

### Schedule 470, Construction and Repair

Class 251, Philadelphia—One portable punching machine—Bid 160, \$1,040; 185, \$1,800.

The names of the bidders and the numbers under which they are designated in the above list are as follows:

Bid 9, American Machinery Company; 13, Brown & Sharpe Mfg. Company; 22, James S. Barron & Co.; 41, Chicago Pneumatic Tool Company; 85, Kemp Machinery Company; 96, Manning, Maxwell & Moore, Inc.; 106, L. R. Meisenhelter Machinery Company; 114, Niles-Bement-Pond Company; 118, Niagara Machine & Tool Works; 124, D. Nast Machinery Company; 125, O'Brien Machinery Company; 146, Sherritt & Stoer Company, Inc.; 149, Swind Machinery Company; 159, D. H. Stoll Company, Inc.; 160, Southwick Foundry & Machine Company; 161, Southern Sales Company; 176, Vulcan Engineering Sales Company; 180, Watson-Stillman Company; 185, R. D. Wood & Co.

## Judicial Decisions

ABSTRACTED BY A. L. H. STREET

**INVASION OF TRADE RIGHTS.**—Infringement of a valid trademark is actionable regardless of whether the infringer acted innocently. But where a complaining manufacturer does not rely upon such a trademark, but upon a claim of unfair competition consisting in the palming off of goods on the public by a competitor as having been produced by the former, intent to defraud is an essential element to be proved by the plaintiff. When the name under which a patented device was marketed during the life of the patent has become a term descriptive of the nature of the article, the patentee will not be protected in its exclusive use after expiration of the patent. Other manufacturers of the same type of device may use the same name, but not in such manner as unnecessarily to lead the buying public into believing that in buying articles not produced by the original manufacturer his product is being obtained. Although a manufacturer is entitled to enjoin a former employee from unconscionably divulging confidential information, derived in the course of the former employment, to aid a new employer, a competitor of the old, in diverting the old employer's trade, a manufacturer who has virtually covered the entire jobbing market, while protected in a monopoly by a patent on goods sold, cannot secure an injunction against solicitation of his old customers by a former employee, in the interest of a competitor on expiration of the patent, since that would virtually give him a continued monopoly. When a patent is about to expire, a competing manufacturer who intends to engage in the production of the same articles may lawfully write letters to the trade, stating those facts and make any other truthful statements bearing on the competition, but the courts will grant relief against the sending out of letters containing veiled and mysterious allusions tending to discourage persons in dealing with the original manufacturer. But before damages can be awarded on account of this, the complaining manufacturer must show with reasonable certainty what loss ensued. (*United States District Court, Southern District of Iowa, American Specialty Company vs. Collis Company*, 235 Federal Reporter, 929.)

**AUTHORITY OF SALESMEN.**—Persons dealing with salesmen are legally bound to take notice of limitations on their authority. So, when a representative of a manufacturer is authorized merely to secure orders from customers to be approved or rejected by the manufacturer, he cannot make a contract for an absolute sale binding on his employer. (*West Virginia Supreme Court of Appeals, Toledo Scale Company vs. Bailey*, 90 Southeastern Reporter, 345.)

**LIABILITY IN PERSONAL INJURY CASES.**—An employee, in suing at law to recover damages for injuries sustained through a defect in a tool or appliance used by him, does not establish a right of recovery by mere proof of the occurrence of the accident and of his consequent injury. It must be shown further that the employer was aware of the flaw or would have known of it if reasonable and proper inspection had been made. Where a defect arises in the course of the use of tools or appliances, the employer is not responsible for such defect in the absence of proof of sufficient time and opportunity to discover the flaw. Such incidental dangers arising during the course of employment are risks which the servant takes upon himself. He has better means of observing the imperfections than has the employer, and it is his duty to use proper care to discover them, and when discovered report them to his employer. (*Pennsylvania Supreme Court, Weaver vs. Wohlsen*, 98 Atlantic Reporter, 1078.)

**LIABILITY FOR INJURY TO FACTORY VISITORS.**—Although a manufacturer who expressly or impliedly invites persons to visit his plant is liable to them for injuries sustained through his failure to use a rea-

sonable degree of care to have the premises reasonably safe, the same strict liability does not apply to a person who is trespassing or who has called to visit an employee in the establishment. As to such a person, the manufacturer is merely bound to refrain from active and affirmative negligence tending to injury. Hence, where a factory visitor assumed the responsibility of finding his way out, after calling on an employee, and, disregarding a plain means of exit through a door in front of a stairway, walked around the stairs and opened a door into an elevator shaft, into which he fell, there was no liability on the part of the manufacturer. (*New York Supreme Court, Ridley vs. National Casket Company*, 161 New York Supplement, 444.)

**INTERSTATE FREIGHT RATES.**—A contract for a freight rate less than that established in accordance with the interstate commerce act is invalid, although the lower rate was in force when the contract was entered into. Hence, a manufacturing company that established its plant on a certain railroad line under agreement that shipping facilities would be afforded at fixed rates is not entitled to the benefit of those rates on the tariffs being increased. The provision of the Federal Constitution which prohibits any State from passing a law impairing the obligations of contracts does not apply to acts of Congress in dealing with interstate commerce. (*Mississippi Supreme Court, W. M. Carter Planing Mill Company vs. New Orleans, Mobile & Chicago Railroad Company*, 72 Southern Reporter, 884.)

**INJURY TO MACHINERY IN TRANSIT.**—In a suit against a railroad company for injury to mill machinery while in transit, the North Carolina Supreme Court holds that a consignee is not entitled to refuse to receive a shipment, as against the railroad company, merely because it has been damaged, where the damage is only partial, and subject to repair. He cannot reject the freight and recover its full value, but must accept it, and make claim for the amount of damage done, if the injury is one for which the carrier is liable. The damages recoverable in such case are the excess of the value of the machinery in an uninjured condition above its value in its actual condition on arrival. (*Whittington vs. Southern Railway*, 90 Southern Reporter, 505.)

**WARRANTIES IN SALES OF MACHINERY.**—Motors were sold under a written contract containing the provision: "The company [the seller] agrees to correct, at its own expense, any defects of labor or material in said apparatus which may develop under normal and proper use within 30 days after the starting thereof, provided the purchaser gives the company immediate written notice of such defects, and the correction of such defects by the company shall constitute a fulfillment of its obligations to the purchaser hereunder." Held, in a suit brought by the seller to recover a balance due on the price and defended by the buyer on the ground of defects in the motors, that there could be no implied warranty as to the condition of the motors because the express warranty was exclusive, but that the express warranty against "any defects of labor or material which might develop within 30 days" covered latent as well as patent defects. The purchaser could not rely on defects discovered after the lapse of the 30-day period. When a seller's warranty is broken, and he fails to remedy the defects, the buyer may recover all damages following as a natural and direct consequence, not including such damages as might have been avoided by the buyer's exercise of reasonable diligence to minimize the loss. (*South Carolina Supreme Court, Westinghouse Electric & Mfg. Company vs. Glencoe Cotton Mills*, 90 Southeastern Reporter, 526.)

**DUTY TO FURNISH CARS.**—A railroad company may validly agree to furnish cars to a shipper for loading at point on another line. It is within the scope of a traveling freight agent's implied authority to make such a contract. (*Kansas City Court of Appeals, Kissell vs. Pittsburgh, Fort Wayne & Chicago Railroad Company* 188 Southwestern Reporter, 1118.)



